

*Bhutan,  
Gross National Happiness Leader  
Becomes Ecocity Leader, Too*

Report on the potential of an ecocity project for  
the Panbang area of Bhutan

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Site of the proposed ecocity just west of Panbang, Bhutan

*We are looking due north near the south central edge of Bhutan. Within the orange dotted line periphery are the two planes of Tungkudempa, upper area toward the right (northeast) which is on a platform about 200 feet above the Dangmechu (“chu” means river) and lower areas to the lower left platform (southwest) which rises about 30 feet above the Dangmechu and the Mangdechu, the latter being west of the site. Where the two rivers join they become the Manas River flowing onto the plains of northern India about four miles to the south. The pink dots represent the precipitous bluff dividing the northeastern upper and southwestern lower planes.*

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## *Introduction: Bhutan's World Leadership*

### *Expect powerful synergy from GNH and ecocities*

Nothing could be more important than Bhutan's self-assigned mission to wean the world from its reflexive mania for constant growth and endless ever greater consumption of the Earth and all its resources. This tragedy of misunderstanding threatens to undo the health of a whole enormous planet. To alert the world to the notion that we need to think in terms of "Gross National Happiness" instead of raw massive production and consumption – and the happiness of nature as well as the Bhutanese people and all people everywhere – is nothing more than putting life values ahead of economic growth and at last getting our priorities right. In addition there is the not small matter that infinite growth on a finite, if very large planet, is physically impossible.

Nothing could be more important also than knowing what to build and at the scale of the largest things humanity builds – cities, and by extension the built environment of towns and villages as well. That means we need to be investing in and constructing ecologically healthy settlements. We also need to reshape the cities we have built, and also reflexively, following simply what was possible because we rather suddenly had cheap, powerful fuel energy. Thus all around the world we redesigned cities for cars instead of people in the last one hundred years of the 4,500 year history of cities. Once cities were reshaped and scattered far across the landscape so that only cars could make connections between most people possible, the problem of reshaping cities for the health of humanity and nature became enormous. But with clear sight of the sort developing in Bhutan the difficult task should not be impossible.

Putting these two initiatives together – 1.) human-supportive and nature-supportive values ahead of consumptive growth and 2.) understanding what is healthy for humanity to build – may constitute one of the greatest opportunities for leadership conceivable. By the time humanity is so far out of touch with reality as to be changing the climate of the planet and even raising the seas, something that would have been seen as the wildest and most unrealistic of science fiction just twenty or thirty years ago, we now know we need powerful healthy ideas and leadership. And now we see such leadership from the small country of Bhutan.

Bhutan is poised at this moment to embrace this enormous and very promising solution in an ecocity on the scale of a modest town in the Panbang area

of the country just four miles from the Brahmaputra Plain where the cascading rivers of Bhutan rush dramatically out of the mountains to abruptly fan out and begin slowly meandering across the almost completely flat expanses of northern India. (Panbang is pronounced more like “PON bong.”)

By the way, this being an electronic report, if you want to see the images in more sharp focus you can most of the time zoom in for more detail.

### *The approach and intent of this report*

The author of this report wishes to make clear both the approach and the intent of this report at the outset.

The intent first: to influence city design and building everywhere in the world as if we needed to change such precedents, trends and habits immediately – by way of model solutions in Bhutan. The project in the Panbang area would attempt to embody the best of all such “ecocity” thinking in the context of values for happiness that humanity has created and accumulated to date: the compassionate, the healthy, the beautiful and the just.

The approach is to utilize all that I think I have learned, and in some cases originated, in my 45 years of working on ecological city issues, actual physical projects, policy initiatives, far flung study and educational outreach. This report reads more like long feature article or extended essay than a government report or set of zoning code recommendations. But in any case it is ordered according to a fairly clear outline as shown in the Table of Contents and the most important ecocity ideas, issues and principles are evident herein.

Also regarding approach, architects everywhere have to work with clients and site conditions, which are both unique to the locality, both natural and cultural, and universal in relation to ecological principles and the realities of available building materials and the arrangement of functions of any built community. In addition there is the style of embellishment that expresses the traditions of the people, the detailing and decoration that a culture believes to be important that has to be respected and integrated into the final product. The task of designing a community, then, involves the mix of directives from all the above, coordinated by whatever knowledge and creativity the architect/planner/urban designer can bring to bear.

In the case of Bhutan and the Panbang site, there are the constraints of the climate and location on two fast-flowing rivers at their confluence. And, there are the considerations that must be given to the laws and regulations of the newly formed democratic government forging its unique way forward into the 21<sup>st</sup> century as, already, a leader among nations due to its very meaningful embracing of a Gross National Happiness set of standards for healthy human development and protection of nature.

I will bring forward ideas in this context that I believe may in some cases involve changing national and city policy as well as provide specific suggestions

for layout and design for the development of the approximately 110 acres south of the new national highway. On a map, the site is like an equilateral triangle with one corner oriented pointing south, one side against the mountains raising on the north, and the other two sides joining at that southern point where the two rivers, the Mandechu on the west and the Dangmechu on the east, rush together forming the Manaschu, known as the Manas River in India. The lands of this triangle I call “flat lands” in the plural because there are two distinct plains, one on the northeast rising above the other. There is a rocky platform approximately 200 feet above the two rivers in the northeast half of the overall site and a sandy platform below a steep bluff toward the southwest that is approximately 30 feet above the rivers. The upper platform is known as Dungkudempa and the lower platform that terminates in the south at the rivers’ confluence is called Anala.

Before walking the site and listening to preconceived ideas for what activities should go where I would have thought the most significant placement of the new town would have been by the confluence of rivers on the Anala plain. But earlier thinking suggested a commercial district, a small town in its own right, on the main east-west highway on the Dungkudempa plain and a separate town, Anala, by the confluence on the lower plain.

If we are to have a serious world model for ecological design hoping to change not only Bhutan’s patterns of urban and small town development but the world’s patterns of urban development at all scales, which I believe is very much needed, then it would be crucial to make one or both communities, the one on the Tungkudempa plain and the one on the Anala plain, as thorough and complete as possible in ecocity terms. Since the national highway currently under construction would be immediately adjacent or even go through the Tungkudempa site, that would dictate a short, 1/3 mile connector south to the Anala site. If the two towns were to carry the mission of the critique of the private automobile to the level of being car-free towns, then the practical solution would be to have a parking lot for both cars and buses from which travelers could disembark for walking about Tungkudempa and in some cases residing there for some time. From there it would be an easy trip walking, bicycling or taking perhaps small cart-sized vehicles south the short distance and down the bluff at a shallow angle to Anala, which would be a thoroughly car-free town designed around the size, speed and needs of the human body, mind and spirit.

With this most basic arrangement considered it is important to mention something of the universals we are working with, the basic ecological principles at the core of my following layout, design and policy proposals.

### *The city as a complex living organism*

First there is a principle that could be thought of in several ways. Most basically, cities, towns and villages are living organisms in their own right. Not just symbolically but functionally, they have a close analogy with all complex living organisms. I call this the “anatomy analogy.” We need to get the anatomy of

the city right, with all its basic features and functions organized well and close together, like organs in an organism. In terms of spatial relations this could be stated as the simple formula: “access by proximity.” Place the variety of basic functions simply close together. We have here the truism that the shortest distance between two points is a straight line. Like many truisms this is not strictly true. The shortest distance between two points is placing them close together in the first place. The design to make that possible is the crucial element in the creation of healthy cities for a happy future, happy for both humanity and nature.

This same arrangement can also be clarified by understanding that cities have been largely dissolved and spread across vast landscapes by automobiles and their enormous power of transport fueled by gasoline. Like some kind of pervasive and perverse solvent, gasoline, used in cars to make everything seem easily accessible over great distances, has melted out the earlier compact city built mainly for pedestrians into the city in a flat two-dimensional format covering vast areas of land causing innumerable problems. These problems include the paving over and waste of agricultural and natural land, waste of energy, money and time, the generation of local air pollution and global CO<sub>2</sub> accumulation in the atmosphere and resulting climate change for the entire planet. While I was on my trip to Bhutan, May 18 through June 12, 2013, the Earth’s atmosphere surpassed 400 parts per million of CO<sub>2</sub> whereas at the beginning of the Industrial revolution it was 280.

There is something truly surrealistic about us little humans drastically changing the atmospheric constituents of a whole planet and its climate and even raising the oceans to flood the coastal areas worldwide. But that’s how large human population, average per person consumption and cities and their current problems have actually become. Another problem generally “swept under the rug” is the death and injury of millions of people on the transportation system every year – car crashes – plus elimination of the good exercise of walking and bicycling, the salubrious effects of clean air and urban areas free of the pressure, noise, smell and physical hazard of heavy motorized traffic. The bottom line here is that if we are to achieve the “city like a living organism” – the anatomy analogy – then the lesson of the value of organization of complex systems in three-dimensions – 3-D not 2-D – is very powerful and needs to be learned.

### *My objectives*

I have been brought into the design and planning process of Bhutan mainly for the Panbang site in particular, which aspires to be a powerful example of ecological “city” design, if of a very modest size town. In ecocity circles, this is just fine as a scale in which to work. A small sized town can exhibit the features and functions and good arrangement of relationships of such features and functions of an ecological city and is much more “affordable” than trying to build a whole large new city all at once, which is being attempted at Tianjin Eco-city presently in China, a city for 350,000 people. It is easier and cheaper also than to

face the challenge of transforming an existing and in many ways “set in its ways” larger town or city.

In ecocity circles, even within an existing city, a smaller project, say covering as few as three or four blocks, could demonstrate the whole systems unities and synergies of the anatomy analogy in what we call an ecocity “fractal.” A fractal is a fraction of the whole that has all the essential components present and well arranged for healthy functioning. That is, housing, work space, commerce, education, food and water distribution, recycling and reasonable disposal, public open spaces such as parks and plazas and networks such as streets, rails, pipes and wires for various purposes. These all have to be coordinated together. Sometimes we call such a design a “complete” design or an “integral project” meaning all components are “integral,” or necessary, to one another for healthy functioning.

But if the small two towns in the area one mile west of Panbang are to be as powerful in influence as history now calls for, they have to be so complete, so “integral,” so successful as a “whole systems design” that such a solution would also involve and even require the national context to be considered as well. Thus I will have comments on national policies as well as local designs for Anala and Dungkudempa. And, considering its pivotal place in Bhutan’s development history, I will have a few suggestions for the capital Thimphu as well.

All told, I will hope to show that ecocity design – knowing what to build – is one of the chief ways to attain happiness for both citizens and for the natural world, a goal far superior to the illogical, even crazy idea that humanity can grow and consume more and more and more of the planet forever. The higher values clustered around “happiness” are now the chief requirement for surviving into the future and realizing a healthy set of ways of thriving.

## *Ecological limits and the situation in Bhutan*

### *Individuals – taking freely but limited by natural constraints*

Living things throughout the history of life on Earth have had a formula for survival of individuals and the preservation of species in their slow evolving. That formula has been a dance of two dynamics, each individual taking from its ecology enough to thrive and reproduce: take the optimal amount and best variety of, mainly, things to eat in the case of animals and minerals powered by the sun’s energy in the case of plants. “Optimal,” not “most” is the key operational guidance. The ecological limits of various locations, sometimes called “bioregions,” and ultimately the limits of the immense Earth, its lands, waters and atmosphere, dictate rules and at the same time give the freedom of birth, life and opportunity to



all living things. That dynamic dance was always one of taking what is needed by the individual organisms, and the environment limiting the amount and kind of things for sustenance of all those individuals collectively, that is those very similar ones called species. The optimal ends up being high biodiversity and lots of healthy individual species and organisms in the total living system.

Then with people, everything changed – or so we thought when we acquired the power of tools, clothes and shelter and spread out across the planet – and built, ultimately, the collective cluster of shelters called villages, towns and cities.

Suddenly we people, or our not too distant ancestors anyway, came to the conclusion that we could do just about anything we wanted and as much of it as we felt like. The thought was, “limits no more!” Both capitalist and socialist systems (and the blend of the two that is the reality everywhere, though there are differences) have embraced this philosophy and strategy.

The idea was that we could grow infinitely and ignore the discipline that had earlier prevailed, called natural limits. We were adding something nature hadn't thought of which was human creativity, or so we thought. Human hubris began to forget just how creative nature was itself. Now unlike the lion that could eat only so much we humans could consume endlessly more and more. No lion could eat ten times as much tomorrow as it did satisfying itself the day before but people with their production of all sorts of things could accumulate a hundred times as much of various things. Let's face it, cultural production of more – and even more of beautiful things – was fun, virile and in some ways, secure.

Only more recently have some of us woken up to the realization that large though the Earth is, it remains finite, limited. Powerful as the sun is in powering life on Earth through chlorophyll, it too – sunshine – is limited in quantity and quality of what it can deliver, and most of what humanity has tapped into to magnify its production has been based on chemical stores of the sun's energy over millions of years by our friends and benefactors, the ancient plants. The chemicals of storage are, as we know, the fossil “fuels,” though they can be used for many purposes other than burning, uses such as in the production of plastics that can be recycled indefinitely when treated properly. Meantime, burning these organic based chemical products draws down the available resource, extinguishing its future potential with one use and always impacting the atmosphere in destructive ways when the quantity is large – and this needs serious assessment and solutions.

### *Bhutan's unique history*

There's a remarkable document in Bhutan's recent past, the Bhutan long term planning paper written in 1999 entitled “Bhutan 2020: A Vision for Peace, Prosperity and Happiness” by the Planning Commission members of the Royal Government of Bhutan. It is stunningly environmentalist throughout. I've never seen a government-produced document like it. On page 36 under “Our environment” we read, “For its size, Bhutan probably has the greatest biodiversity

of any country in Asia, and it is for very good reasons that our nation has been declared one of the world's ten most important 'hotspots'." Then later we read, "The first 'modern' legislation enacted was the 1969 Forest Act that was specifically aimed at protecting our forests." By policy at least 60% of the country must remain under forest cover and for every tree cut three must be planted. The paper boasts Bhutan being the only country in the world that sequesters more CO<sub>2</sub> than it emits. This appears to still be true.

There is a section in "Bhutan 2020" called, "Counting our Development Assets." Generally one would count under such a heading economic growth and production figures, resources such as coal, lumber, wool, etc., automotive manufacture, farming, new highways, dams, electronics, IT and so on. But here we see in the 2020 Vision paper that, though Bhutan ranks low in terms of level of development, considered one of the "Least Developed Countries" in United Nation's terms, it ranks relatively very high by health and literacy standards – and they would point out – happiness.

"The story of our development is one of broad-based progress from the most modest of beginnings. It is one that stands in contrast to the experience of many other least-developed countries, some of which appear to be losing ground in their efforts to improve the living standards of their people.

"Why have we succeeded where others have been less successful? It cannot be because the constraints that have confronted us have been less severe or because the starting points for our nation's development were more favorable or benign. Indeed, there can be few other countries that were more isolated and remote and in which the terrain is more forbidding and the population so dispersed." The authors go on to describe the country's "tangible development assets."

"First we have built unity out of diversity... The emergence of Bhutan as a nation state has been dependent upon the articulation of a distinct Bhutanese identity, founded upon our Buddhist beliefs and values, and the promotion of a common language... This identity... binds us all together and enables us to share a common sense of destiny."

"Second, we take quiet pride in our independence. Unlike many other developing countries, we were able to resist colonization and we entered the modern world in the confident knowledge that we were our own masters. We were never forced to adopt an attitude of inferiority and subservience that colonial masters imposed on subjugated peoples... This independence of spirit... has given us dignity as a nation and helped to shape a common sense of purpose."

Another asset: Bhutan's religion. "Firmly rooted in our rich tradition of Mahayana Buddhism, the approach stresses, not material rewards, but individual development, sanctity of life, compassion for others, respect for nature, social harmony, and the importance of compromise."

Now we can begin to see why Bhutan has not only the independence of mind to self-confidently step forward with the potentially history-reshaping

happiness standards but with the willingness to consider the city reshaping ideas implied by designing and building ecocities. Here we see the confluence of these two ideas: happiness to reshape economics and ecocities to reshape the human built environment... at the confluence of the country's two largest rivers: the confluence of two confluences.

### *Religious features*

One of the most important considerations for any ecocity or ecotown in Bhutan has to be the traditional role of religion, the spiritual connection with the land, life forms, even mythical beings like the Thunder Dragon – Druk Yul – the traditional name of the country – and beliefs uniting people and nature. From the highly three-dimensional dzongs, half fort and half monastery, rising into the sky like small mountains, to the temples, chortens, waterwheel-powered prayer wheels and the ubiquitous colorful prayer flags, everywhere you look there is a sense of the powerful presence of nature's forces and human well wishes sailing out from the flapping flags and spinning wheels, out through the winds over the highest mountains in the world and seemingly right out through the overarching total universe. There the distant flickering lightning on starry nights and thunder rolling down the unending dizzy-steep valleys become the ethereal carrier waves for the well-wishes rippling out from hundreds of millions of prayer flags. I experienced such a night on my birthday at the hilltop Panbang Guest House and at the same time, stepping outside, was surrounded by hundreds of luminous white/green glowing fireflies turning on and off, on and off, flowing about me as if the air were a liquid through which they were drifting, swimming and darting, shimmering into the distance then disappearing into the velvety black canyons below. Mystery and respect pervades all in Bhutan and hence religious structures and detailing such as placing chortens properly and stringing flags liberally are essential in building an ecocity in this location. The above quotes from the Vision 2020 paper, pages 10 and 11, expresses this, but it is well to remind ourselves as we now look to particular design features I am here suggesting.



### Location of Tungkudempa and Anala

*The above image appears over the entrance to a restaurant in Phuentsholing, Bhutan. I've employed Photoshop to emphasize the rivers flowing out of Bhutan and into Northern India and located the blue dot where at the site for the two new cities.*

### *Prevailing conditions*

A visit to the Panbang area with Senior Urban Designer Tshering Dorji and another visit to the country's Geology Department in Thimphu produced some clarifying information about the conditions at the Tungkudempa and Anala sites. (Tshering is pronounced like "Chring!" – the sound of an old cash register.)

Due to limited resources, the exact levels of the landscape above the rivers has not as of this writing been precisely determined by survey. I believe my estimates, however are only plus or minus about 15% off the actual measurements and this should be close enough to get a good take on the design suggestions I will put forward here. Some relatively minor adjustments can be made later.

What is clear though is that attention to possible flooding and earthquake damage has to be taken seriously. We – myself, Senior City Designer Tshering Dorji, local leaders from the Panbang area and people in the Geology Department – discussed glacial outburst floods, with the general conclusion that such events

were so far up stream as to allow time for these floods to be attenuated and spread out over long distances and considerable amount of time, thus raising the levels of the rivers, especially the Mangdechu, the west side river, but not dangerously for development on the higher Tungkudempa or the lower and southern most Anala platform. A warning system has been installed recently too for double security downstream, that would provide time enough for evacuation.

The potential for landslides of sufficient scale to cause temporary dams and lakes to build up and then discharge large floods has to be taken seriously, though once again such upstream landslides of a serious scale would seem to be very rare and very seldom pose an extraordinary danger. The historic record as well as we could determine seemed to confirm this. As to downstream landslides, the mountains at that location have become small enough approaching the Assam plane as to look far less threatening than the much higher and steeper sloped mountains up stream. The chance of landslides downstream impounding water that would rise, back up and flood the Anala site seem, therefore, quite remote. The slides, in any case, in that area of Bhutan, could come from heavy rains on the somewhat slippery and not that well consolidated rocks in the geological strata or be triggered by earthquakes. In all cases, the Geology Department recommended some further study of the features upstream from the sites in consideration. Meantime people have built at a reasonable level above such risky rivers and life goes on, as it does where I come from.

Meaning earthquakes: the author comes from an seismic zone famous in the United States for earthquakes, the San Francisco Bay Area – simply building strong with the intention of riding them out is the accepted strategy. It requires a somewhat more expensive building structure. But so does the extra investment that goes into the beautiful decoration and detailing of Bhutanese architecture. The bottom line for reasonable safety is to simply budget for spending a little more money on the correct features, a strategy generally already employed for esthetic and religious reasons in Bhutan. The small traditional largely bamboo structures fairly common locally near the site are flexible enough to do well in earthquakes but probably not very helpful, except in the lessons of how to take and deflect shock more effectively. At the city scale that could be strongly influenced by ecocity solutions at Tungkudempa and Anala typical earthquake strengthening would probably be enough while ecocity design in the GNH context would be the more important model and message.

Then there are the conditions of weather and climate. It was interesting to me in general that everywhere I went in Bhutan the people took for granted that climate was changing, warming and drying out some, with weather events becoming less regular and more extreme. In the United States the oil and coal companies finance studies pre-designed to ignore certain information and emphasize exceptions to the rule to try to convince people there is no problem with burning more and more fossil fuels and hence the gullible people in large numbers, after all these years of evidence of climate change and shrinking glaciers,

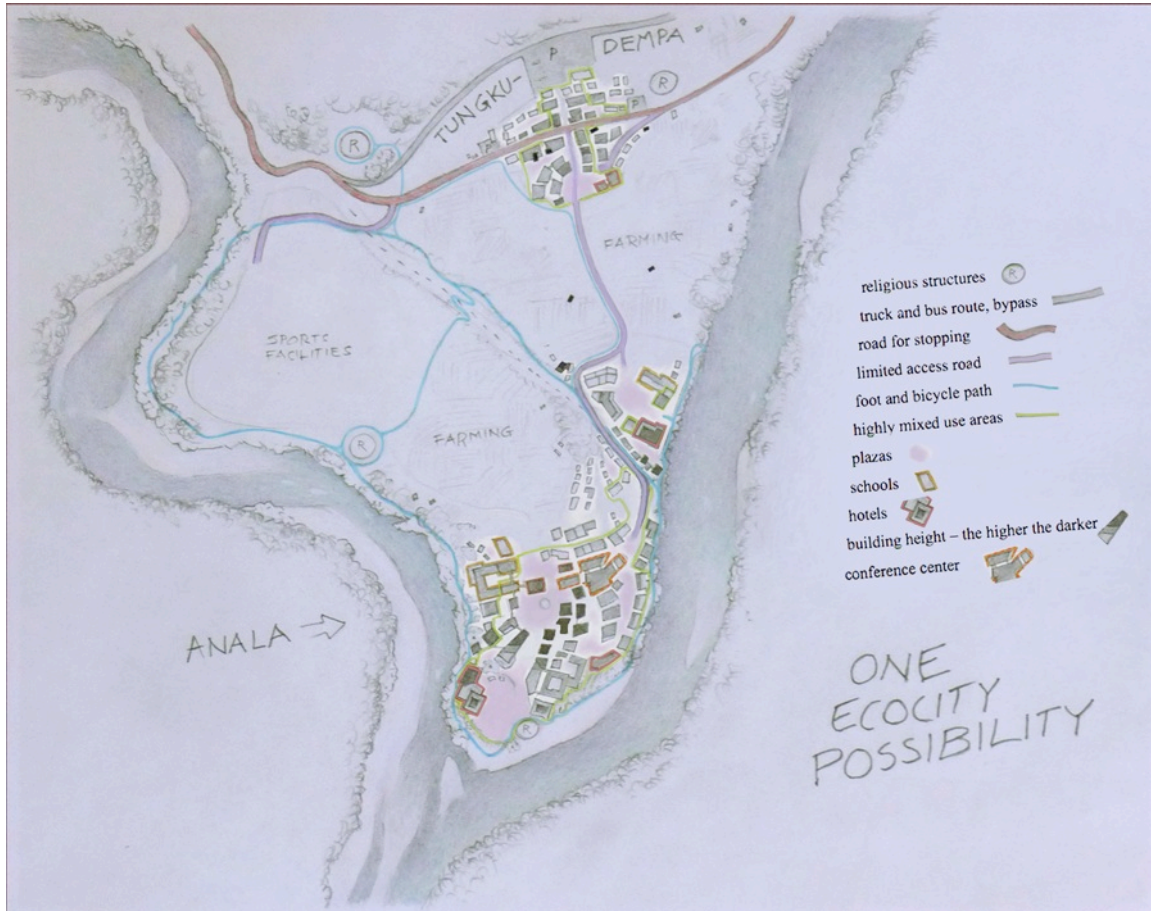


still believe climate is not changing or if it is, it has nothing to do with human activity. I find the “take-the-facts-at-face-value-and-think-about-them” attitude of those I’ve spoken with in Bhutan to be refreshing and far more mature.

Meantime, I experienced extremely hot weather in the Panbang area one day, May 27<sup>th</sup>, and the next day, very heavy afternoon and evening rains. I realized for probably the first time, coming to a place with remarkably hot blaring sun and heavy rains, one following quickly upon the other, that umbrellas are excellent for sun on hot days as well as rain on wet ones. The implications for environmentally sensitive design at that location then, is not to capture and use the heat of the sun, a typical “solar passive architecture” strategy in the relatively cool part of the world where I live and where I have designed and built attached solar greenhouses, but rather the construction of roofs that shelter from both rain and sun while allowing breezes to flow underneath providing a good measure of cooling. Similarly in Bhutan, most buildings have a second roof something like an umbrella, which is mildly pitched and supported to some height above the traditional flat roofs of buildings. The upper roof is a second roof for shelter from sun, rain and in the high north, snow and allows air to flow between the roofs, mitigating the extremes of climate, a good example of working with local natural conditions.

I would like to see this design idea emphasized in ecocity plans for Bhutan as a lesson for cities everywhere: respect and work with your local conditions. In addition, such climate sensitive roof design also illustrates that many traditional solutions are among the best ecocity solutions. And another point of importance: the basic set of functions is the essence of ecocity design as is the sort of functioning of the roofs just mentioned. Thus for example the mixed use, compactness of ecocity pedestrian arrangements can be executed in Victorian style, modern, Santa Fe style, European village, Bhutanese... all sorts of styles.

## *Particular layout and design features*



### **Proposed layout of New Tungku Dempa and Anala**

*Basic features with key to the right. Sports and farming areas not detailed for reasons explained in the text. The diagonal dashed line in dark gray running about 45 degrees down from the upper left to lower right of the peninsula is a steep bluff about 170 feet high. The river on the left is the Mangdech, the one on the right the Dangmechu and the one headed south out of the map is the Manaschu, the suffix “chu” simply meaning river.*

### ***Proper proportionalizing: first, they have to be “car-free”***

One of the most important concepts for people to grasp – at any time in history – is the concept of correct proportionalizing. In medicine a dose has to be within a range of the optimal or an attempted healing would likely fail if, say, the dose was only one third of best, and if it were three times the optimal, a life might even be lost.

When it comes to city design the particular denial prevalent is that cars are just a little problematic but basically OK. They can remain about the same size and function and be improved. Unfortunately nothing could be farther from the truth. Proportionality rules here too. The car isn't just, on average, about three times as heavy as a person but 20 to 30 times as heavy, and in normal operation, moves about 10 times as fast. Its volume is about 50 times that of a human being – standing still and requires even much more space when moving. How can anyone design a descent environment to live in sharing the same space with things so proportionally off balance as cars are to human bodies?

That's just the quantitative proportions we are looking at with the automobile. The qualitative has not just to do with the pollution, global heating, climate change, the destruction of fossil "fuels" by burning and many serious, often deadly "accidents" guaranteed when planning for automobile infrastructure. But since qualitative off balance proportions also prove to be operative, then we should understand that cars take their place in a whole system, namely as a transportation vehicle in the total layout and character of a city or town or even village, scattering the infrastructure out over "car-dependent" large areas of land.

In Los Angeles while I was living there in the 1960s we decided we'd had too much already with the terrible air pollution that was killing outright about an extra 1,200 people a year and frequently making most of the rest of us sick any number of weeks every year. So we fixed the car – we put a "smog device" on its tail end and achieved our clean air goal of ridding the Los Angeles basin of about 90% of its air pollution. The only trouble was, we demonstrated how the car could "fix" the situation. But now 50 years later we have global heating and climate change afflicting the whole world because cities everywhere followed Los Angeles into the reality of car-dependent cities, largest creations of humanity. We failed to notice that the car was an integral part of a whole system called the city. We should have fixed the city by understanding how all the city's parts worked together.

Not only in this case was the scale or quantity problem of proportionality missing from society's consciousness, but the awareness of the car/paving/land use pattern/cheap energy (gasoline) total "whole system" was missing from the prevailing thinking too. There was no sense of proportionality of importance as well as no sense of physical, that is quantitative, proportions being way out of balance, but qualitative proportionality was absent too.

There is, *and must be*, in other words, the proportionality of *importance*, of understanding whole systems, ecological systems of chains of cause and effect and networks of cross influence. Get proportionalizing of importance (qualitative assessment) wrong, (as well as assessments of sheer quantity proportions) and expect real disasters. Those disasters we actually have today growing up around us are largely due to the intense dependence of cities on cars. You will note this is also beginning to apply to Thimphu.

The automobile, in other words, has to be taken as a deadly serious issue in its own right: the fewer the better in cities and none at all, by far the best. In the country, it's a different story and specialty vehicles like farm cars and jeeps, light and heavy, generalized and specialized trucks and agricultural vehicles/tools like combines and bankout wagons make sense and help enormously. But the rule is that form and function have to be considered together in context, and in the city context it's bicycles, transit vehicles and elevators and most important of all, pedestrian environments with complementary activities close together and well designed.

A correct sense of proportions is precisely what GNH is all about. It should be noted that the idea of Gross National Happiness, that is, putting economics and development in the service of human and environmental values instead of believing in the radical nonsense that infinite growth in a finite environment is the healthy goal of economics and organized human endeavor, is probably the largest most consequential case of proper proportionalizing conceivable. Get it wrong and we are doomed; get it right and we have a good shot at thriving.

All this to say, and hopefully justify "car-free," and get readers of this report to take seriously, that the sister communities described herein – Tungkudempa and Anala – have to be car-free if they are to be ecocities. Though the agricultural tool we could call the "farm car" is just fine, in numbers it would be tiny compared to the number of cars in the city designed around cars.

### *Tungkudempa – connecting with the outside world*

Dorji Wangdi, the Labor Minister who invited me to Bhutan having seen a presentation I made at a future of cities conference in Korea, proposed that the national highway have a bypass where the heavier traffic – truck and busses and cars not wishing to stop at Tungkudempa – would best pass by to the north against the base of the mountain that rises above the plain of two platforms. So let's start our tour of the basic features of the two towns I will focus on. We will begin at the northern edge of the northern town.

Anathema though parking lots are to me and my theories of ecological cities and as supportive as parking lots are of cars, in the conventional context in most places around the world parking lots are definitely needed to connect the city of the future with the transportation we have existing now between cities, though eventually that can change. In Bhutan it is hard to envision rails negotiating the steep and unique-in-the-world amazingly precipitous convoluted terrain to be traversed between cities. I will have a rail suggestion for Thimphu later, however.

Let's assume we arrive by bus, not car, or we are passing through on the new national highway, maybe driving a truck. We stop, gas up and park. Tungkudempa was, in the vision of the earliest thinking about ecocity development at this site, thought to be a good location for a commercial center – I agree. A problem with most intentional communities self-described as "ecovillages," and there are more than two hundred of them now in a loose



network of communications and contacts around the world, is that most of them are not on highways. Some think of them as “dead end communities” because they are mostly literally at the end of a road that branches off a highway and ends at the ecovillage. Urban ecovillages are of course an exception. But Tung kudempa could take advantage of the highway to sell goods and provide services, have a commercial function including a small general store such as we find in the present Panbang and would not be a retreat from the society “just passing through.” It is economically connected to that society.



Our site-exploring party passes a Tung kudempa farmhouse

*This is the stony soil plane in the northeast half of the total area under consideration that appears to be about 200 feet over the rivers to the east and west. It is extraordinarily hot here in May and I learned the effectiveness of umbrellas for sun as well as rain on this trip. Anala and the Mangdechu are beyond the bright yellow green plane in the background, with the last row of mountains in the distance before they drop under the sediments and slow meandering rivers of Assam. The hills we see here on the far side of the river are also part of the Royal Manas National Park. Our party was led by Tshering Dorji and local civic administrators.*

It is also a jump off point for Anala and, I suggest, should have a pair of small hotels for people who might want to walk 1/3<sup>rd</sup> of a mile through farmland



to Anala and explore in the easterly direction to Panbang just across the new bridge over the river and one mile away. In general I'm suggesting for world tourism – and here in Bhutan too – encouraging *less* frequent travel (to save on fuel and reduce the usual excessively shallow experience tourism) while also encouraging staying longer “when you get there” (to experience and learn more and enjoy more about other cultures and geographies).

### *Layout, blocks, streets and “mixed uses”*

The somewhat haphazard arrangement of the building footprints, in both Tungkudempa and Anala that I'm proposing, is not too different from the placement of some of the fairly large buildings in Thimphu. Largely I encourage this arrangement to provide a variety of open space shapes and demonstrate the higher, more basic function of “being there” as compared to “getting there.”

The usual street pattern of the great majority of cities, even when the streets may be winding instead of straight lines roughly in the pattern of rectangles on a map, is designed for efficient transportation in vehicles, as if running around the city were the primary function of city life. Mixing radial streets with the rectangular grid, as in Washington, DC, even better displays this “going somewhere” approach. This started way back with vehicles pulled by animals and as cities began to experience the first effects of spreading population to the point that more and more time and travel were required for normal city functioning.

But if the idea is to feel the variety and diversity of being in an urban space, then the interesting shapes that might seem “left over” “odd ball” open spaces between the buildings – the buildings being more primary in importance for doing things, producing things, exchanging things and living various aspects of life from residential pleasantries and private experience to attending school or making crafts or exchanging things in markets..., then the arrangement I'm suggesting expresses and facilitates the sense of “being there” more than “going there.” That is also true for the open spaces themselves: being there more important than the going there on streets and highways.

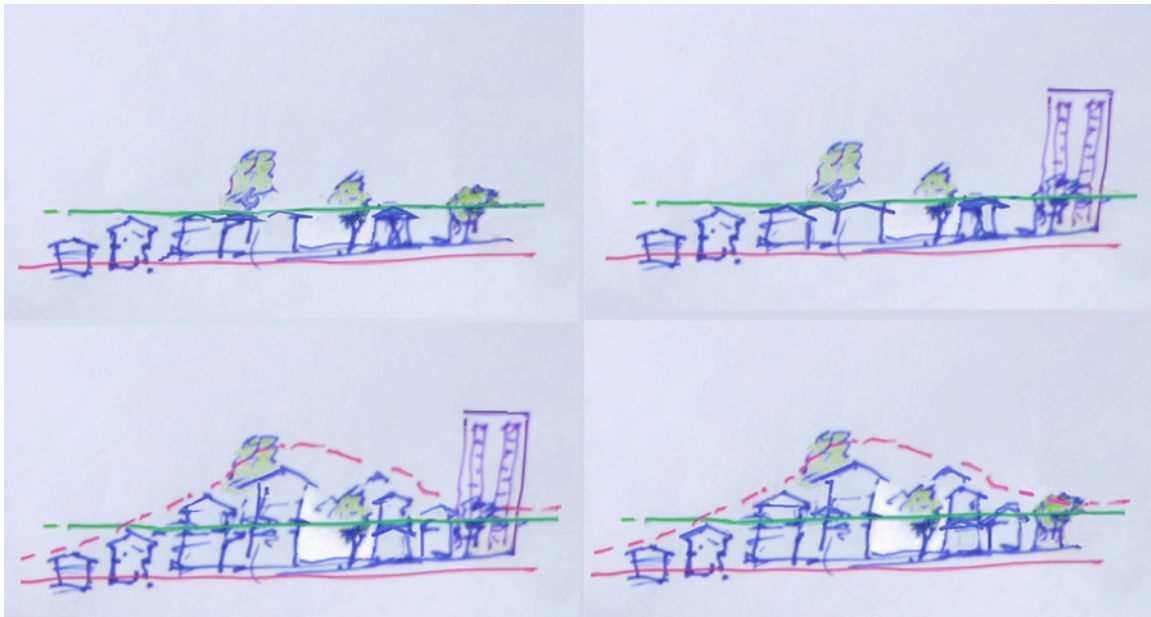
All this is in the logic of the pedestrian environment that makes for the efficiencies and pleasures of pedestrian urban, town and village life. And as said, I utilize this pattern in both Tungkudempa and Anala. The result is, as in Thimphu which is high density compared to villages in Bhutan, spaces that look “left over” but which can become plazas and parks of a wide variety of sizes and shapes. In Thimphu they have mainly turned into parking lots for cars, but that need not be the case and shouldn't happen here at the ecocity site.

In general for easy pedestrian access everywhere small blocks are ideal, so one does not have to walk long distances to get from one side of a block to the other. Thus in most cases I've reduced the blocks to no more than one fairly large building at a time: maximum pedestrian “permeability.”

As to what goes on where, the general prescription is highly “mixed uses,” meaning that in a short distance different types of complementary activities are taking place: residence, work place, commercial space, schools, public gathering places such as plazas, hotels, restaurants and cafes, government, economic and business places of a wide variety and so on. I’d even add beautiful views of nature have to be understood and provided. The notion again is “access by proximity” and the idea that the shortest distance between points is not a straight line but placing the points close together.

### *3-D – taller buildings for density and “access by proximity”*

I’ve suggested relatively tall buildings. People living in car-based cities think of villages as made up of buildings one to three stories tall. A number of planners and architects I’ve talked with in Bhutan have suggested a short height limit of two or three stories, which in their case is just what’s happened in villages historically, though three stories is common in the rural Paro Valley area and the dzongs violate the rule too. But “access by proximity” is greatly facilitated by the higher density of population that can only be accommodated in buildings with enough floors to place larger numbers of people and a larger variety of activities closer together. This is the lesson of the anatomy analogy that living organisms gives to us when we notice that all complex living organisms are not spread out in a flat “2-D” (two-dimensional) form but are generally a quite compact and “3-D” (three-dimensional) form. This is one of the primary lessons of organic nature and ecology. The notion again is that thinking in terms of “access by proximity” we can conclude, as said earlier, that the shortest distance between points is not a straight line but placing the points close together.



“Hill” height profile (previous page)

*The above are four quick sketches, originally on a napkin, for Tshering Dorji in which I was giving a general picture of the limits of low height limits, upper left. Upper right shows what a considerable number of people fear if there are no height limits. Lower left shows the awkward juxtaposition of modern big box-like building. Lower right is my basic suggestion that provides for considerably more people than the upper left low height limits arrangement. The lower right option creates something like a hill shaped skyline. The native tree attracting local and migratory birds, just left of center, is raised up about fifteen feet on an earthen “box” as a kind of celebratory eco-art piece attracting local birds, butterflies, bees, etc. The area highlighted by Photoshop in lighter color, near white, is an interior pedestrian plaza – very quiet and pleasant, like an “urban room” with no pollution, bad smells, noise and hazard from cars.*

But I am not suggesting excessively tall buildings either. For these two small ecocities I would recommend around seven or eight stories for the highest structures which would be quite sufficient to get the number of people per acre up high enough for some “urban” vitality – and more people served than by one and two story buildings. I would also suggest a wide variety of heights for architectural diversity and visual interest – all of which could be with traditional detailing of surfaces of basic forms common in Bhutan as desired.

Many architects and planners believe four stories are sufficient because structures taller than that intimidate certain people – the vertical drops seem threatening. In of all places though, the Himalayas provide an environment where people are used to vertical plunges and towering natural prominences. The dzongs are impressively tall and generally elegant, quite beautiful, a positive hint that private and commercial architecture as well as governmental and religious could be well designed in a more three-dimensional context.

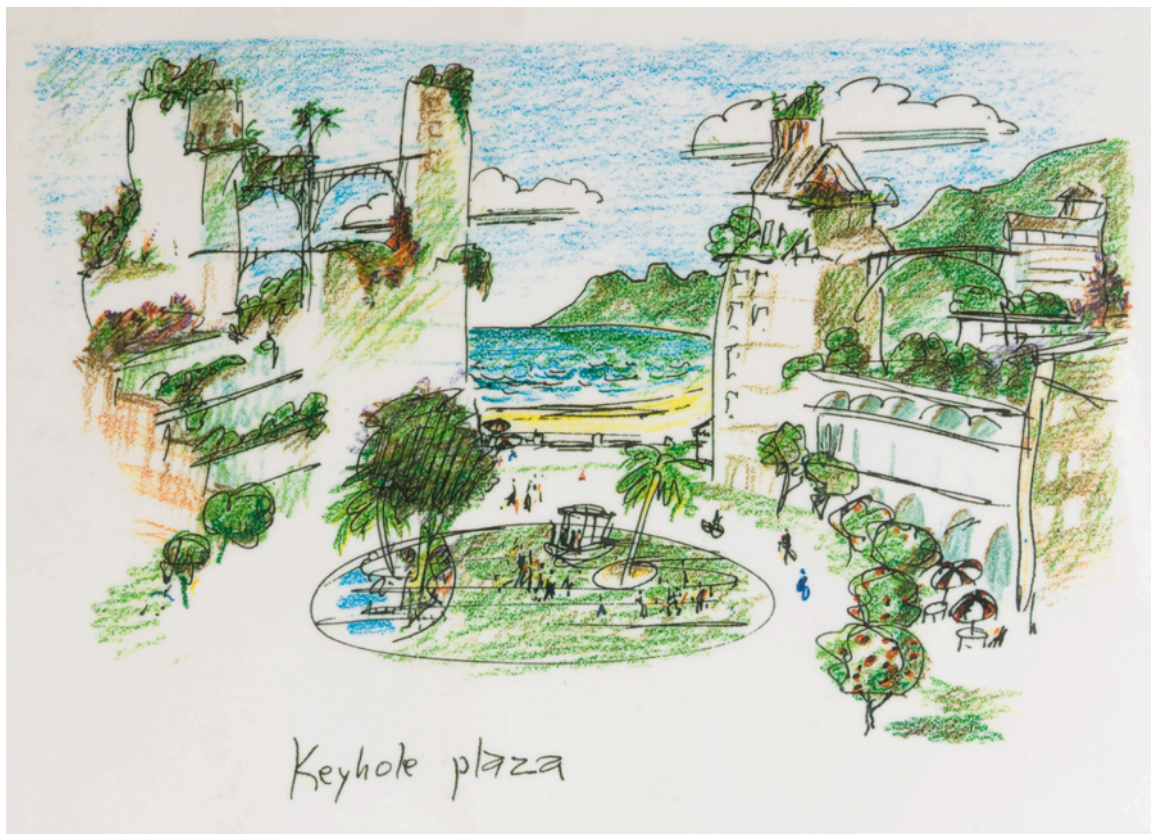
Nonetheless there is a sense that mild heights are more comfortable for most people and thus I recommend the fairly frequent use of terraces to break up vertical plunges. For example, an eight-story building might have a three-story rise from ground level, a terrace at the fourth level (which in Bhutan would be called the third floor) and another rise above that to the eighth level (the 7<sup>th</sup> floor in Bhutan).

### *Keyhole or View Plaza – a powerful ecocity design feature*

On our walking tour from the parking lot at Tungkudempa we are still in that northern section of the cityscape we are designing while considering some of the basic design ideas behind ecocity theory and development: commercial connection with outside world, local basic layout, access by proximity, three-dimensionality and so on. We notice right away that a few of the buildings in the more active commercial area are connected for great pedestrian access, also called pedestrian permeability, by bridges between terrace levels, usually on the third floor level, leaving enough room for specialized vehicles to carry things

underneath. Also, Many buildings have running balconies for people either sitting or walking about and most of those covered for the sun and rain.

Now I'll introduce a particular design feature I believe has a powerful positive influence on the psyche of the citizen and visitor alike, uniting cultural product and natural environment. That is the "keyhole plaza" or "view plaza," a plaza like most but with a corner or side missing with the buildings arranged to focus on a view that conspicuously celebrates nature in the form of a mountain, river, coastline, etc., or nature's services, such a food production or a great forest sustainably logged and therefore still functioning in a mostly natural fashion. I like the term "keyhole plaza," thinking of the old style keyhole with an opening for the shaft of the key and a slot for the patterned flange of the key that does the actual locking and un locking, which looks a little like the map with view of such a plaza. Another way to integrate the natural into the town is to make a beautiful design feature of a local waterway, for example by leaving open or opening an earlier buried small watercourse through the center of a town. A particularly majestic or ancient tree, a small waterfall or even an intriguing outcropping of rock related intimately with the design of buildings and open spaces could serve the same basic purposes of a Keyhole plaza: bringing nature into the city.



Keyhole plaza, also known as a view plaza

*This drawing, one of mine from 25 years ago, illustrates a plaza with a view of a cherished natural feature at that location, celebrated by the configuration of the cultural product – buildings and public plaza – framing the view, making it obvious that nature there is in fact greatly appreciated. I'm suggesting the use of two such plazas, one at Tung kudempa looking over the agriculture fields representing nature's supply of food. And there's another such plaza at Anala celebrating the confluence of the two rivers becoming one, flowing out of the mountains and almost immediately after, meandering slowly from there on to the sea.*

In our case on the south side of Tung kudempa we find a semicircle of buildings with two of them framing the view down the road through the farmland to Anala, as revealed on the maps, page 16 and page 26, below. We will look more closely at this feature, the keyhole plaza, when we discuss the design of Anala at the confluence of its two rivers.

Leading out of Tung kudempa's keyhole plaza, the path connecting the northern town and Anala is wide enough for construction, delivery and emergency vehicles but generally restricted to people on foot, bicycle and small electric cart for the disabled. People with relatively heavy loads, carpenters doing everyday repairs and some others such as farmers could use such carts as well and occasionally larger vehicles. But, the two towns are essentially car-free. Any car present without strong reason and special permit would be subject to a large fine. The experience of walking the 1/3<sup>rd</sup> mile through the open space of the farms provides a real sense of connection with the land.

### *Ecotropolis – the new kind of ecological metropolis*

I was asked to design both Tung kudempa and Anala, and also to consider what sort of development should happen in Panbang, one mile from the middle of Tung kudempa to the east over the new bridge which is opening at almost the exact time I'm writing this report. I demurred on Panbang, citing my limits of time and just how much I could cover on this assignment. But I will say this much, that general ecocity principles should apply: centers-oriented development suggests that a few more buildings reaching up a story or two vertically higher than most others there should be built to add to the diversity and density of the center, tending to create something more of a walkable core to Panbang. Again the idea is to place more people closer together doing complementary activities to better serve and socialize with one another. Panbang, like the other two centers to the west, might do well to build a small hotel or two and enlarge or add more general store types of products. Other than that I would have the suggestion that more development of the type that has been popping up relatively far from the center of Panbang should not be allowed: keep farm land and open space there and resist the increase of development that scatters and makes the whole area more dependent on automobiles in the valley.



But more important than this prescription for Panbang is the larger issue I have lately been calling proper design for the ecological metropolis, the “ecotropolis.” In many metropolitan areas around the world there has been the tendency for cities to spread out until they grow together in a region where formerly there used to be distinct cities towns and villages. In growing together the whole matrix fuses into mostly undifferentiated veneer of streets, parking lots, franchise restaurants, scattered business districts, widely distributed occasional hospitals and schools, single family houses over a wide area, single occupant cars and so on. The entire “mess” I dare call it for its negative impacts on resources, the natural world and people’s health, one would think is not the problem in the Panbang valley or Bhutan.

But think again. This pattern is well on its way in Thimphu and starting in the Panbang valley as it is, I am told, becoming more automobile dependent every year. The same thinking that designs a small ecotown or two at the confluence of the rivers west of Panbang applies to the larger area as well as to the specific site where new buildings are being planned. The lessons on the small scale in the Panbang valley as well as the much smaller site of the compact new pedestrian towns can model the world’s best ideas for transforming the infrastructure of cities, towns and villages – all of them. The result can be, on the small regional scale of the three towns involved, two west of the Dangmechu and one east of that river, a model that not only shows how ecocities can be designed, built and operated, but how a metropolitan region can be. Small scale, yes but with all essential principles and details present and functioning well. Thus in this short section we add to “ecocity” another even newer very important term and idea: “ecotropolis.”

### *The slope of the new land: entering Anala*

We enter Anala not on the lower plane but at the upper edge of the bluff. The treatment here is to cut some of the stony material out of the upper plane to create a sloped surface on the upper Dungkudempa platform and to use the excavated material as fill that angles down more gradually to Anala’s lower plain.

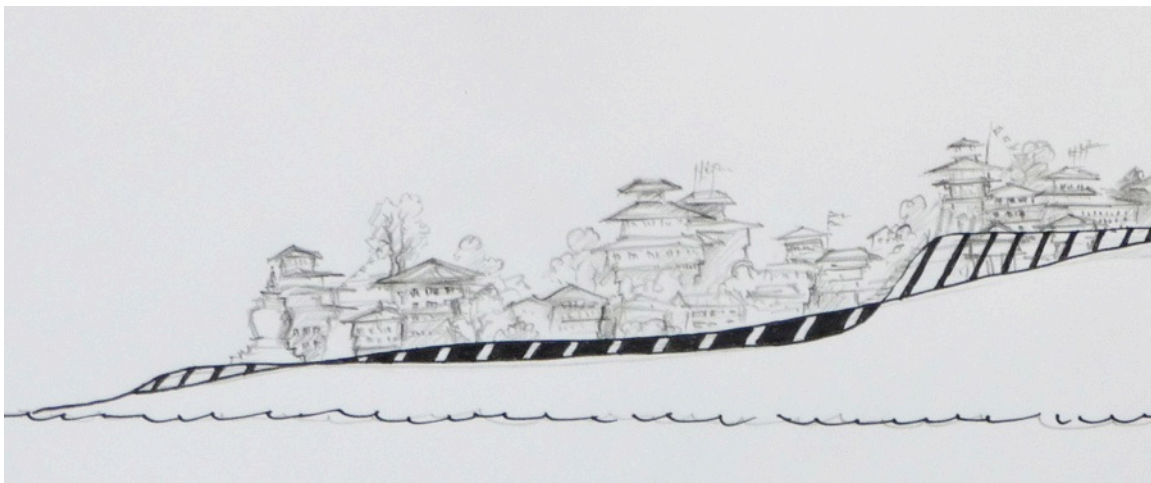
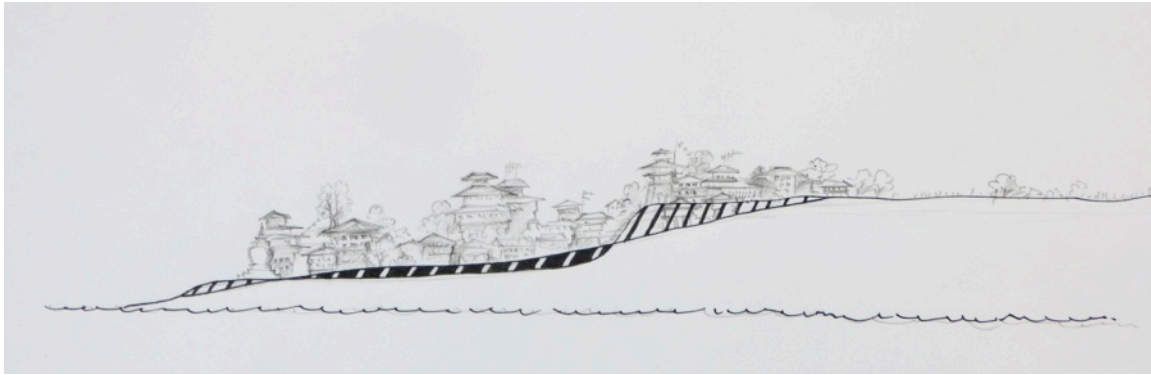


Cut and fill in the northern part of Anala, maybe armoring

*The duller yellow represents relatively small amount of material removed and the brighter yellow a greater amount. The brighter white represents the deeper compacted fill, and the closer to mid gray tone area represents fill, but not as deep. The idea is to create sloping land rather than a sharp bluff at the southeastern edge dividing the upper platform from the lower, with sloping views to Anala and down river, and an interesting urban relief (3-D) configuration. The building in dark gray at the western end of the cut is tall, a prominent design feature. The same for the one at the southern tip of the bluff where most of the soil has not been cut away. The road slopes down at a moderate angle – a little hard to pedal up on a bicycle. The cut at the southern tip, near the bottom of the map, is sloping gently toward the view downriver. The hot red jagged line represents armoring that might be decided upon if further studies justify it for flood safety.*

We can enter the northern more elevated section of Anala from the farmland on the upper platform by going straight ahead and coming into a small plaza. This could be mainly a residential area – apartments and condominiums – with views to the plaza and/or down slope to the southern areas of Anala or out to the river to the southeast. A hotel about five stories high with terraces might be at the other side of the plaza as we arrive, convenience store, cafe. The hotel rises up high enough for views everywhere including up river to the new bridge.

If instead of heading straight forward into the plaza we turn right toward the bluff between the upper and lower plane, we see another taller building, perhaps a mixed use public building or religious structure that commands the edge of the bluff looking over the lower Anala platform below. The road turns a sharp left here and begins its decent onto the lower plane.



Cut and fill with generalized outline of Anala

*The dark diagonals against light background represent cut and the light diagonals against dark background represent fill. General height “skyline” is represented here. South is to the left, north to the right.*

### *Economics: the main functions and business plan basis*

As we move down the bluff along the sloping street and into the main area of Anala on the lower platform, it is a good time to look at the overall pattern of uses and the rationale that makes it possible to build here and maintain a population. By this point in our report we have some basic principles and enough details of the major ecocity concerns and features that we have a good ecocity introduction, and in some depth too. But how to pull the pieces together, strategize the new communities’ functioning and pay the bills while making fresh income?

### *Overall arrangement*

When Labor Minister Dorji Wangdi originally told me he would like to see a small city for education, eco-tourism and sport at this spectacular site on the confluence of two rivers, for the confluence of the two ideas of Gross National Happiness and ecocity design, I was delighted. The basic economy then looked like a special formula that could attract both investment for reasonable return and gifts for the value of the enterprise as a world model to solve numerous important problems and lead the way to a happier and healthier world – an investment of another kind.

### *Sports*

I'd assumed water sports of the rubber rafting or kayaking sort, due to the location on the two rivers that run at almost white water speeds, along with something of a sport of exploring the Manas Wildlife Preserve. Because there are tigers and rhinoceroses there, it seemed that activity would probably be accessible mainly by riding elephants – and in fact that is exactly what's happening a couple miles south in the Manas Preserve, which I saw with my own eyes. Minister Wangdi had in mind field sports as well. This is not my area of knowledge so I have simply left a section of land for others to detail for sports facilities, assuming some of the residential and visitors quarters would be for sports related coaches, managers, athletes and fans. My own opinion is that participatory sports are a healthy pleasure but highly competitive sports are not helping that much in times that need fewer distractions and diversions of serious time and money away from getting on with understanding cooperation among people and learning from nature, perhaps most urgently, learning how to build – and make profound investments in – ecologically healthy communities. My opinion, for what it is worth and stated from a career in trying to better understand the larger patterns – problems and solutions – is that we have far too much emphasis on competition in the world and far too little in terms of efforts for cooperation and learning about... the larger patterns – the problems and solutions that are presently making such major and dangerous changes in the world.

That said, there remain the positives of sports and coaches and facilities managers could be in residence as well as the athletes. In Bhutan there is a long winter break from school; given the very hot climate in the spring and monsoon rains in the summer, winter is a great time for athletes from the cold winter regions of the country to do some training on the Anala plane.

### *Serious tourism*

Regarding two major core economic engines I'd promote, education and eco-tourism, I believe these could be the core of something I came to call "serious tourism" while living and working in Berkeley, California for almost 30 years. The University of California at Berkeley, as many know, is probably the best public University in the United States, competitive for quality education with Stanford, Harvard and Yale. I noticed – it was hard to miss – that Berkeley was swarming with high school students and their parents at various times of the year

as they looked over the prospective campus. Later in the students' lives, tens of thousands of students' parents arrived to stay at the hotels, eat at restaurants and check in on their offspring. Then there were the various institutes, conferences, research projects and all sorts of science, arts and cultural events and all those people taking part in them that appeared there because of the core that is the educational focus. I came to think of this swarm of people looking for some form of enlightenment and the money they left behind in Berkeley as "serious tourism." I think the environmental/ecological variety of exactly that would be a very strong component of the economy and a magnet of activity for Tungkudempa and even more so for Anala.

### *Ecocity U*

One of my long time proposals I've delivered in a number of consulting assignments has been the suggestion to establish somewhere an ecocity college or university. Some have responded that it's a good idea to have a school focused on green architecture. But the idea is larger than green buildings.

We need to pull together all elements of theory and practice and therefore involving the deep cultural history of urban design and in addition, what the patterns of ecology and evolution might have to do with city design. All other related disciplines would have to be included and given order by the best arrangement of the city itself. Involved would have to be studies of law and politics that produce ecocity zoning and tax and investment economics, the science and engineering of energy and transport studies emphasizing renewables for energy and rails, bicycles and pedestrian design and facilities for the higher objective of transportation beyond just mobility: access. Engineering and city design related science would be required especially for the higher density, higher tech components of the city and earthquake and flood safety. The entire enterprise would have to be international in scope taking in best knowledge from different cultures. Traditional and organic agriculture – with the knowledge as background that automobile-based sprawl forces farms off vast areas of the best soils.

And of course, climate and weather and global heating and CO<sub>2</sub> sequestration studies would have to be part of the overall research and teaching. A weak area of study that needs emergency attention, that ecocity design also harmonizes with by taking up much less land than sprawl, is natural sequestration of carbon and up-take of water in soils by holistic management of grasslands and forests. Add to that wet lands and shallow waters on which peat can build up carbon hundreds of feet deep and sea grasses can similarly take CO<sub>2</sub> harmlessly out of the water countering the acidification that is increasing in oceans. The case most conspicuously relevant here is the work of the Savory Institute and Zimbabwe rancher Alan Savory himself, in which by grazing herds of cattle in close packs in imitation of the way lions in Africa herd herbivores like wildebeest and the way wolves used to herd bison in North America, grasslands can be





Descending from the Tungkudempa platform to the Anala plain  
*Tshering Dorji on the left with dark glasses and the rest of our crew on their way  
down the steep path of the bluff, May 27, 2013.*

returned into enormously rich and biodiverse sinks for carbon taken directly out of the atmosphere. Such natural agriculture and silvaculture related techniques need a center and we should rush to collect relevant information and make it available through a base at Anala, both for scholars and students in residence and out through the internet but based there for all the added meaning of the GNH initiative and the leading position enjoyed there for being *the* pioneering international ecocity project.

Deep history would have to be part of the curriculum to ferret out the best nature-influenced designs of the past. For example, the building of entire communities on elevated fill, or “artificial hill” we might say, goes back to the oldest cities of any size in history, 4,500 years to the Sumerian cities like Ur, built in the flood plane of the Tigris and Euphrates Valley of Mesopotamia. This solution of simply rising up above the floods in a compact town is a solution that could save the approximately one third of humanity that is otherwise will be forced from coastal areas by rising seas and heightened storms by the end of this century if we don’t solve our climate change problems very quickly now. It is

amazing how simple this solution is and that almost no one ever thinks of it, probably because the car-based city layout covers so much land the notion looks like it couldn't work, and indeed it can't for sprawling 2-D development patterns. It can only work in compact pedestrian style city layout. The car has blocked that kind of awareness, even memory of its history.

In terms of the economics we should study at Ecocity U, it would be the economics built on what we build, the demand side of the climate solution, the supply side of which is better energy sources, insulation, recycling and the like.

#### *Ecocity Institute*

The idea of an ecocity university is a very ambitious one, but it could start with an Ecocity Institute at the scale of a large NGO or small college that pioneers the idea, bringing at least the core of the studies together along with some of its key innovators. Partnerships with one or more existing campuses for a presence at Anala might be negotiable – Bhutan is a powerful magnet for many reasons I won't begin to enumerate here. Facilities would be needed for teachers, students and administrators plus the “extras” that make such a place desirable for such a population. That is, in addition to classrooms, labs and field excursions such an institution supports cafes, small performance and movie theater, information services from copy shops to computer repair and sales shops, internet connections with up-to-date information technology, some sports facilities as mentioned earlier, and so on. The most basic attraction would be relevance to a much happier, healthier future.

#### *Eco-tourism*

Eco-tourist at Anala could dabble in such knowledge as that mainstreamed at the Ecocity Institute. This is exactly the kind of education and tourism needed and made physically real by the design and construction of the town in which the institute and the tourists would be housed. My guess is it would focus such needed attention on the subject of the ecocity itself that the Ecocity Institute would bring in international grants and investment from people who are beginning to catch on to the value of best-designed cities in solving problems. But there would also be people there who would understand the power of the confluence of these two ideas, GNH and ecocities, there at the confluence of rivers, and these people could serve as docents and guides for the open minded and curious. The very different ecocity layout and design, as well as the traditional detailing of Bhutanese architecture and the spectacular location would be a major attraction for your more recreational and passive “observe and enjoy the food” tourists as well as those looking into what these two ecotowns mean for solving the problems of the future. Something as seemingly small and prosaic as subtle but easily accessible signage to help explain the ecocity features of the city would help turn tourism there into eco-tourism.





The notch in the Anala platform by the rivers' confluence

*Here we are approaching the Dangmechu just above the confluence. Note that the road has a cut in the plane showing the river is about 30 feet below the top of the platform. Note also the magnificent trees there. A number of tall ones should be worked into the plans for both Anal and Dungkudempa.*

The hotels themselves would employ local people who would be encouraged to live at Anala or Tungkudempa. There would also be the resident people with the sports-oriented companies – rubber boats and kayaks could put in up stream, arrive for lunch at Anala and continue on to one of the guest houses about five miles downstream on the west bank of the Manas, perhaps to spend the late afternoon and night there and in the vicinity, to return a day or two later, perhaps by the elephants, to the bank opposite Anala. A colorful scene could be made of regular arrivals of the elephants, a boat could be paddled at an angle across the river and downstream from the ecotown, then pulled with the tourists by



cable back up to Anala in a similar manner I experience at a small hotel called Fish Tail Lodge on Lake Phewa at Pokhara, Nepal.

### *Agriculture*

Perhaps most important from the ecocity sustenance point of view, the local farmers could be encouraged to live at either of the two ecocities. A number of my informants told me farmers would rather live in small farmhouses isolated from any town – fair enough, but probably not true for everyone, especially the younger generation. In any case the offer could be made and I noticed some of the farmers took immediately to television as soon as electricity arrived. In other words I think some, especially young people, would find it most interesting to live in an ecocity configured and very culturally diverse town as a fascinating addition to their farming.

A special note should be made about agriculture too. I was struck by the limited list of agriculture produce and product in the Panbang area: oranges, corn, bamboo and a short list of others. Speaking with Dr. A. Thimmaia who works as a consultant for the Bhutan Department of Agriculture and has written an organic agriculture handbook for Bhutan, it would seem there would be a strong rationale for a research presence, even a small research station as part of the Ecocity Institute that might reside at Anala. He listed for me a number of agricultural products that would seem to grow well in the area with some added specialized knowledge. Making and repairing farm tools for the region could be located here too.

### *Branding Bhutan*

In 2009 Bhutan hired McKinsey and Company, of India, to examine policies and practices around Bhutan and make recommendations for Bhutan's healthy flourishing into the future. At a cost of USD \$9 million the company dispatched a phalanx of young MBAs who scoured the country for ideas and answers to help Bhutan into careful development, with a decidedly consume-and-grow capitalist economics slant.

It should be noted that up until then a lot of careful development had already happened under the guidance of GNH instigator Jigme Singye Wangchuck (pronounced wong-chook) the fourth King of politically united Bhutan. In the period from 1977 to 1999, longevity – just one sample but a very significant measure of health and happiness – went up in Bhutan, reported the Vision 2020 paper cited earlier, from 46.1 years to 66.1 years. That is stunning improvement in a mere 22 years. Mostly the leap forward was due to sanitation and medical advances radically reducing infectious diseases, but also aided by improving infrastructure and education. By careful design under the Fourth Druk Gyalpo (Dragon King) or simply moving along the trajectory of maturing Buddhist sensitivity for all sentient beings – human and other life forms – Bhutan was “developing” with a minimum of loss of its traditions and some serious consideration of what made the people more content and “happy” – definitely

healthier. (Conquering infectious disease also made Bhutan much more attractive for tourism.)

The McKinsey project advocated Bhutan consciously “brand” the country, and that led toward the Bhutan Tourism Council of Bhutan engaging the advertising giant Ogilvy and Mather to come up with the theme and logo: “Happiness is a place,” complete with an image of the national flower, the blue poppy. It is a slightly strange image in that the “a” is so sketchy as to almost fall off our radar screen as a letter in the alphabet and the “t” looks more like an “f” because of its subtle turn to the right at the top of the diagonal stroke instead of at the bottom.



To the critics of the McKinsey project and those like myself who feel a little annoyed by logos that tend to be overly sweet and sentimental, I have to admit the wording is clever. More importantly, there is substance behind the “branding.” I’m also somewhat cynical about the whole notion of branding as a strategy the purpose of which is to get people so focused on something that they buy it in the commercial market place against its competition. But I also had the experience of sharing a stage in Korea, not the same conference as the one where I met Dorji Wangdi, with Simon Anholt, the world’s most noted purveyor of national brands, that is, he consults governments on what their own people and foreigners think of their country and how best to focus and promote such thinking for whatever values of success – usually GDP – the government is interested in. Tourism and export/import activity are generally what the goal is all about.

However Anholt pointed out in his speech there has to be real content at the core. Branding cannot be built on a fantasy or a goal that isn’t anchored in the realities of the country being branded. To this view, branding is simply crafting and disseminating information about the best of what the country wants to raise in

social consciousness with the objective of promoting the kind of development people in the country decide they want. In the case of Bhutan this amounts to serious economic strategy with a very special approach and goal: social and environmental goals predominant.

The implication I'm driving at here is that a little conscious branding of the ecologically informed communities on Tungkudempa and Anala may not be such a bad thing, and, as the confluence of ideas at the confluence of rivers, it has the potential to shape both the economic foundation of why people would want to come to and learn from these two towns – and all of the Panbang “ecotropolis” in the valley – as well as learn how the project could advance Bhutan's leadership in directions the whole world should take. The strategy then would be to put out in a number of forms, the unity of branding, and the repetition branding demands for its effectiveness, the notion that certain powerful answers reside here.



### Confluence of the Dangmechu and Mangdechu

*The Dangmechu to the left, the east, joins the Mangdechu to the right, the west, becoming the Manaschu – or Manas River as it is called in India just beyond the notch in the hills almost due south. The enormous Royal Manas National Park, called the Manas Tiger Reserve on the India side of the border, is on both sides of the Manas River. The confluence itself has been damaged by mining of sand and river stones but could be easily returned to its natural state, approximately a pointed peninsula*





### Cornfield in a city

*The above garden and building are about five blocks from the main street in Thimphu. Together they represent the edge of “density” with productive open space. At Anala and Dungkudempa I’d suggest a four or even five or six story edge with the surrounding farmland in some places. Remember we can utilize terracing, the town rising like a hill above the landscape and providing for more many more people than if low density. Again, this also helps enormously in liberation from automobiles and all their problems.*

### *Food connects us to nature*

“Urban agriculture” fits snugly with ecocity design; my own organization, Ecocity Builders out of Oakland, California, has been involved in a number of urban food gardens and fruit orchards in the San Francisco Bay Area. We even utilized an acetylene torch to take the roof, hood and trunk off a big, powerful “muscle car” and turned into a portable food garden that we called the Vegetable Car that visited the streets, other gardens and various fairs and festival in Berkeley and San Francisco promoting in-city agriculture between 1979 and 1989. In another project we planted approximately 100 fruit trees along streets, in front yards, in public schoolyards, and in some community gardens in Berkeley and Oakland. We proposed, but didn’t get funded, a system for broadening the approach by hiring a city orchardist or two to help with planting, pruning, harvesting and providing classes in urban orchard planting, maintenance, harvesting and fruit canning, pie making and so on for the public. A program like this could take food to the streets. A few cities in the world have a scattering of

fruit trees in streets, parks and plazas, including Barcelona, Spain which hosts oranges – one of the present products of the Panbang valley. Such a program would fit perfectly in the pedestrian streets of our pair of small ecocities – and in Panbang itself.

In the case of Anala and Tungkudempa, leaving much of the land in food production closely associated with the city demonstrates that city and farm need not conflict – we need not pave over our agricultural land for cars and low density development – and at the same time, illustrates that the hard edge of relatively high density immediately next to open food producing land is a very healthy arrangement. We should bear in mind there is no reason for cities to draw down soil fertility since they produce compostable human, kitchen, restaurant and associated agricultural and even woody waste from building materials like sawdust and from paper waste. Even “zoodoo” animal waste has been composted in some cities at the local zoos, including San Francisco. We should also not forget that producing food on the two platforms of these two linked ecotowns should also be a significant fraction of the profitable economic activity in this area.

Agriculture too is often at the basis of “value added” cultural product such as, in a more raw form, lumber and bamboo for building and fiber for clothing, then on to the products of the crafts themselves, parts of buildings, furniture, utensils, fabrics, clothes, art and religious objects and so on.

### *Buddhism connects culture – and cities – to nature*



The small chorten at Panbang and the large one at Thimphu

*One of the suggestions that came from a discussion with the President of the Bhutan Institute of Architects, Dorji Yangki, was that the powerful presence of the confluence of rivers at Anala would suggest a chorten, which would honor both Bhutanese tradition and celebrate the rivers in a manner that honors both the religious and the city-building – and specifically plaza-building – work of the culture in harmony with nature.*



The foundation of much that is unique in Bhutan's culture *is* the Buddhist religion. From its well springs the notions of compassion for all sentient beings that is at the heart of Bhutan's deep concern for nature that we heard about early in this report, as quoted from the Vision 2020 paper. I would suggest a larger chorten, if religious leaders agree, to grace one side of the view to the confluence of rivers. Punakha Dzong is located at the confluence of two rivers in central Bhutan and has a small chorten very close to the confluence itself. Given that the Mangdechu and Dangmechu flow together at Anala then immediately give their waters to other people in other countries and on to the great World Ocean, this location has a prominent position as symbolically – and literally – giving to the outside world the best it can offer, broadcasting from deep history its “happiness” philosophy and the newer synthesis (based largely on ancient wisdom) of the ecocity. The ecocity institute and/or other educational work going on at these small ecocities themselves could be seen as something like radio stations or the internet, attempting the broadcasting of good news, giving like the rivers. There should probably also be a small monastery and/or temple here in the Tungkudempa Anala area, part of both culture and the local economics.

### *Fine grain ecocity architectural features*

#### *Trees*



#### Monumental trees in West Bengal and Tungkudempa

*Above left we see a tree on the scale to be symbolic of the whole town in West Bengal on the road from Phuentsholing to Panbang, and on the right a magnificent very tall tree on the Tungkudempa plane.*



Departing somewhat from the directly economic functions of the city and as relates to the culture in this location, there are the various architectural features, finer grained details than the basic layout of city blocks, pedestrian streets and plazas already introduced. I say “somewhat” because though such features are not directly economic in function, like exchanging information, services, produce or goods, they can set up the environment in which it becomes a pleasure, not a chore, to engage in such exchange. Among them first, an almost “architectural” bridge from nature to buildings, there is the urban forest, the trees. The Panbang area has magnificent enormous trees. They need to be worked into the landscape of the city and grace the architecture, and vice versa, the architecture gracing the trees. We find many large trees still in Thimphu, their association with the larger buildings harmonizing and softening urban infrastructure and life. We should be even more alert at Tungkudempa and Anala to the potential of raising awareness of nature and the best of culture simultaneously.

*Sheltering roofs*



Roofs sheltering from rain and sun (caption next page)

*(from previous page) Above left the flying roof that looks like immense soaring wings – largest roof in the world, the size of 12 football fields – cools the new Shenzhen, China City Hall and Conference Center. On the upper right and lower left we have the very small scale, covered walkways at the Jambayang Resort of Thimphu, with traditional detailing under inexpensive corrugated steel roofs. Lower right, the gap between the lower roof of a building in Thimphu and its “floating,” sheltering higher roof.*

In a hot and often very rainy area such as the Panbang Valley moderating the climate for comfort and healthy functioning in buildings amounts to attaching either permanent or moveable rain and sun sheltering roofs and awnings. As mentioned, I learned there that umbrellas help a lot for both kinds of shelter. Features attached to buildings in cool and cold locations collect and passively store the heating energy of the sun, and, as in attached solar greenhouses, deliver life-giving illumination to plants as well. In places such as Iceland, Japan and northern California there are rare locations where geothermal energy can be tapped for considerable heating energy, and practically everywhere, “geo transfer” of the earth’s steady temperature a few dozen feet down can moderate the extremes in temperature on the surface and greatly reduce the energy used to bring temperatures up to comfort standards.

However, at the ecotowns of Tungkudempa and Anala I would propose enhancing the horizontal spread of typical Bhutanese roofs to do an even more thorough job of sheltering the streets and edges of plazas. Such features could be called attached passive cooling and air conditioning structures. Some covered walkways could be built as well to shelter pedestrians between buildings. There are features like this at Jambayang Resort on the hills east of Thimphu (see photos previous page) that shelter guests and employees moving between buildings and up and down stairs. In addition, these small-scale features illustrate that ecocity design can be expressed on the very intimate scale, the opposite end of the spectrum from larger layout features like city blocks, keyhole plaza and pedestrian streets. They also contrast dramatically with the gigantic hovering roof we see in the upper left illustration for a recently built structure in Shenzhen, China. That roof is essentially an artificial cloud shading the four and five story buildings and two higher towers, the new City Hall and conference center complex. In that hot climate the roof, expensive in initial construction, saves millions of dollars in the long run on energy for cooling and air conditioning.

The image on the lower right shows a traditional two-story building with a gap between the top floor roof and the sheltering shallow-pitched roof hovering above. The breezes pass unobstructed between these two roofs providing a dry and cool layer to protect and moderate the temperatures in the building below and for whatever the occupants want to store in this open, fresh air kind of attic. However some owners and designers are recently sealing these spaces for residential or other uses, usually to enhance income from the buildings – at the cost of added electrical and mechanical equipment for cooling, heating and air conditioning.

Similarly economics with a negative energy impact – and pollution, resource depletion and climate impact – have led to remodeling similar “breathing and cooling” structures like those in eastern Australia called “Queenslanders.” These buildings are elevated six or more feet over grade with steps leading up to a porch and front door and then into the house or apartment. The space under the house, again in a hot climate, is shaded by the house itself with a visually obscuring lattice work of thin wood strips or a kind of hang down skirt surrounding the “basement” of the house. Breezes pass under such structures and the shade of the house above cools the space below and the house as well. Frequently now, however, such spaces are converted into extra units for rental income or family expansion, here too increasing equipment and energy needs to maintain comfort.

At our small ecocities moveable awnings could also be used – even tent like structure to extend out far over streets – to shelter as required by temperature, sun and rain. The pedestrian streets of Istanbul have such moveable “garments” and many market places around the world are sheltered under stretched cloth.



## Bridges between buildings (previous page)

*Upper left: Venice, Italy a completely car-free city that dates back to its founding in 421 CE, almost 1,600 years ago. It is held together by bridges and modest but high value boat traffic. In the upper right and lower left we see a bridge connecting decks between facilities at Jambayang resort. In the lower right photo we see a double bridge connecting classrooms and library with sidewalk traffic below at the University of Virginia, Charlottesville, Virginia.*

One of the most important and barely recognized features enormously helpful in the more dense areas of an ecocity is the pedestrian bridge. Gradually, without much fanfare, bridges between buildings and through interiors of larger complex buildings, on campuses, in airports and sometimes in downtowns are appearing all around the world. In fact they should be seen, like their motorized cousins of elevators, escalators and moving pedestrian conveyor belts sometimes called “people movers,” as serious, relatively low energy supports for the pedestrian environment. They have been with us for over a thousand years as in Venice, Italy, a completely car-free city, and suggested again by Leonardo Da Vinci in his version of the future 500 years ago – maybe he was only remembering Venice where he lived for some years.

There are city design professionals who regard bridges between buildings as taking the liveliness off streets and therefore detrimental to the vitality of urban centers. This is true where densities are not high and where design is alienating, such as where such bridges are enclosed with little visibility and also blocking visibility from outside themselves. The answer to the first complaint is to use them in the right places – where they will get used, which is in higher density areas with uses that complement one another to be connected. To the second complaint the answer is to have them be generally transparent to a high degree, light weight structures of strong materials. For this steel cable and glass are helpful and for pedestrians – who are far lighter than motor vehicles – wood is often sufficient for flooring and railings.

Bridges can also be roofs sheltering pedestrian areas underneath, serving two purposes at once. Our genius third President in the United States, Thomas Jefferson, was an architect, inventor, and intensely curious naturalist as well as the chief author of the US Declaration of Independence and the President in office from 1801 to 1809. He was proud of designing the campus of the University of Virginia at Charlottesville, Virginia. In fact, on his tomb he had inscribed in stone that he was the architect and founder of the University of Virginia but neglected (one might just say *understated*) that he was also President of the whole country. He laid out the campus as a large keyhole plaza, around a central green, two opposite sides on the long axis for classrooms, dining halls and quarters for students and faculty, with on the third side the library and what we might think of as a multi-purpose facility for some administrative functions, formal meetings, presentations, receptions and celebrations. The entire ensemble of structures faced



the missing fourth side of the rectangle and looked out beyond the early campus on to the rolling hills across the valley: a beautiful view. Failing to understand that particular design element, later leaders of the University placed a new building at the fourth side blocking the view to the natural landscape.

More to the point under the topic “bridges between buildings,” he designed and built a covered walkway or portico it would be called in Italy, that connects the constructed three sides of the campus at the second floor level. People could walk on its roof – it provided bridges between the buildings in other words – or could be sheltered from the weather walking under the “bridges.” In addition of course, people could walk between the residential and class buildings and the library on ground level under and perpendicular to the bridges, into the central green or plaza or out into the countryside and nearby town. Some of the new development on campus did pay attention to Jefferson’s original intent and employed the idea of bridges as you see in the lower right hand picture among the four photos above on the previous page.

*Bhutanese architectural styles*

As said earlier, ecocity functions can fit practically any architectural style. Dressing out decoration and arranging smaller spaces consistent with most cultural traditions and expectations for private and public spaces is a matter of tradition,



## Bhutanese architectural detailing in Panbang

*Above, two houses model older and more recent interpretations of Bhutanese styles. The lower two photos exemplify temple detailing under the soffit and overhanging roof structure in the small community across the Dangmechu and upstream about a mile. This being an electronic report, I'd suggest zooming in to about 250% to view the fine detail woodwork evident in the lower right hand photo.*

life styles and expectations of a whole culture. In addition, Bhutanese traditional style has already discovered sheltering, overhanging roofs that ameliorate weather and climate conditions and that breath with the breezes. Also, the dzongs are characteristically very three-dimensional structures rising high like the mountains. Anyone even slightly familiar with Bhutanese architecture can see that Bhutanese styles are carried through in the Panbang area.

There was a certain intelligence in the “branding” that was behind the goals of the planning process in Bhutan, to have consistent styles everywhere, whether there was any thought of the word “branding” or not. I grew up in Santa Fe, New Mexico where the City Council in the 1920s made the decision to limit architectural styles to American Indian and Spanish adobe motifs and thus created an identity we’d call “Santa Fe style” or “the Santa Fe brand” today. It worked, perhaps too well, in that the city is overly “touristic” today. The historic central area was established with narrow pedestrian, horse and burro streets that wind about and are still there in the core creating a pedestrian priority area in which cars move about slowly and carefully in the narrow streets, not quite yet the car-free zone it was from 1608 when the town was founded until about 325 years later when cars began to take over.

Santa Fe style was successful economically and respectfully supportive of the local American Indian traditions and crafts, Spanish history and even Western cowboy culture. As in Bhutan, if not quite so thoroughly, the clothing styles too have reflected the culture located in the area. But, there is a warning in Santa Fe for places in Bhutan: When I was growing up in Santa Fe the old pedestrian town felt and *was* far more genuine than it is today. Since I left for college in the 1960s the city has doubled in population – but spread out to approximately five times the land area, so dominated by cars has it become. The result is a logjam of automobiles on a large number of its streets, scant transit that can’t possibly work the city is so scattered about, and dismal franchise, schlock and boringly common looks-the-same-everywhere-in-the-car-culture commercial strips scattered among uninspired single family houses that go on for miles and miles in the new 4/5ths of the city, along with car based damage to the old pedestrian core. Surrounding the whole thing, at least in the hilly areas with the views, is the “better” exurban development with many expensive part time homes and small hobby ranches for the wealthy.

*Gates/arches*



Another feature of Bhutanese architecture that can be incorporated into ecocity design for the small ecocities west of Panbang are gates of entry and, going in the other direction, exit. I am not sure of all the considerations as to where these are most appropriate so my illustrations will be guesswork for later refinement or correction, but gates express the kind of concern for fine grain detail and meaning that fits well in ecological zones that are, as a rule, complex environments with many things going on close together. As prayer flags broadcast good wishes and hopes to the winds, gates say welcome, but special circumstances, and within we have another kind of zone of special function, respect and some degree of control of access, assumptions of civil behavior.



#### Gate to a secondary school

*Ceremonial entries for building complexes, various institutions and whole towns are celebrated with gates, as here at Kelki Higher Secondary School in Thimphu.*

#### *Higher density relative to size of community*

I'm submitting the photographs below, next page, from Thimphu, as average height for buildings in the Dungkudempa and Anala towns. There can be small farmhouses on the "urban edges" though farmers would also be encouraged, with urban amenities nearby and possibly subsidized low rents, to live in the apartments as well. And many of the farmhouses already on the two platforms, if hosting the active farms I'd suggest, should stay where they are, plus perhaps a small number of new farms. The sports facilities, as discussed earlier, should be

laid out and designed by people knowledgeable about such facilities in an area similar to the one I've designated in the map, page 16. The idea here is, again, placing enough people close together such that requirements for motorized traffic are minimized to almost vanishing. What little is needed for disabled people, special delivery and for construction and emergencies would be only those that fit in these exceptional cases in a pedestrian environment. If the average building height were say 1 ½ stories as some have suggested to me would be "appropriate" in the traditional Panbang Valley, the new communities of the same footprint of buildings would support about one third as many people and be far less capable of supporting a serious educational institution and only much smaller tourism, set of sports activities, normal town commercial activity and so on.

Similarly if the new towns were to have the population provided by my suggested two towns of taller buildings, but distributed that population in buildings averaging 1½ stories, a glance at the map on page 15 would show immediately that there would be little or no room for the farms and sports fields. That's the lesson of density in particular populations. The three dimensionality of living organisms – the anatomy analogy – is important to have in mind as a guidance from the way nature organizes complex functions together.

I've been in villages in Turkey that are only about four by four blocks in total size on the map – and small blocks at that – that had many buildings five stories high. The design variety of the varied "skyline" and arrangement of buildings on irregularly laid out and varied width of streets was enormous. In some cases, it seemed maybe by accident and because of the small size of these villages, the placement of a plaza made it automatically a keyhole plaza because it just happened to be right next to the edge of a very small town's footprint on the map thus providing a side to open country.

Urban density and transport for even small towns and cities (next page)

*Upper left, a space in Thimphu that could be a park or plaza instead of parking lot.*

*Upper right, Pedestrian Day, June 5<sup>th</sup>, 2013, which was also World Environment Day in Thimphu. Almost no cars and it seemed as busy with commercial activity as usual. Lower left, a small electric vehicle shaped more like a car than the cart it is almost becoming – it's design could be more utilitarian for more storage and no need for a front hood that tries to make it look "automotive" not like a golf-cart or work vehicle. Lower left, a street in Thimphu showing the slope of the land, probably not quite as steep as at Anala coming down from the Tungkudempa plain.*



*Last of our walk from Tung kudempa to rivers' confluence*

If we imagine actually being there we can begin to see what the feel of a small footprint pedestrian city would be like. We are walking down the slope of the pedestrian street from the higher ground part of Anala into the higher density lower area, walking past larger houses and a couple apartments in traditional detailing, some in local materials, some with concrete and steel or a mix as I noticed was a very small temple in the tiny community across the river and upstream for Panbang – it was “affordable.” In our two ecocities, all would be thoughtfully designed for earthquake safety and therefore marginally more expensive in construction but with lower insurance rates, perhaps partially financed by special ecocity government loans that help amortize investments over longer periods of time.

As we angle slightly right toward a small welcoming plaza where the sloping path/pedestrian street starts to level out in the main part of Anala we can see through gaps in the trees to our left, which is generally east, the waters of the Dangmechu surging by, and beyond, the far bank of the river south of the town of Panbang. Around this Anala northeastern plaza are buildings in the three story range, some connected on the second or third floor by continuous balconies



similar to those designed by Thomas Jefferson at the University of Virginia but with all seasons roofs or removable and seasonal cloth awnings above those for walking above ground level. To our right, apartments give way to smaller farm houses and we can see beyond them glimpses of farms. Moving beyond the plaza we enter a system of narrow streets and a wider one and here and there. We can see beyond the buildings on the left glimpses again of the river and opposite bank. To our right we are lost in a labyrinth of small streets but nowhere are we more than about 50 yards from a view outward to the natural or farming world.

To try to illustrate this relationship of city and countryside I'll use the more extreme density of the Medieval town of Turette-sur-Loup, France, which I visited in stayed in for several day in 1987. (The name means the towers above the Wolf River.) I will also use a Photoshop version of the parking lot/plaza in Thimphu from our previous page. These are not exactly what I have in mind – Turette-sur-Loup has very few gaps in the town walls while I'd suggest many at Anala, and the example from Thimphu doesn't have the kind of ecocity features I'd add – but you can get the idea from the imagery.



Ariel view of Turette-sur-Loup, France

*This ultra-compact small city is a good example of narrow pedestrian streets and coherent town form, nature retained up to the city's edge. I'd suggest more spaciousness in the streets and many more gaps between buildings for views to the surrounding natural landscape, and in Anala's case, views to surrounding waters.*

Urban view outward (next page)

*Taken from a movie promoting the town, then utilizing Photoshop, we see on the left one of the rare views outward that impressed me when visiting. In the other*

*two pictures I've inset a zoom into the view up the Mangdechu northwest of Anala. Being an electronic report, you might like to zoom in to about 250% here too.*



Confluence view from higher density small plaza (previous page)

*Imagine a sheltered view to a confluence and then add some ecocity features and terrace back the buildings while adding varied heights for the variety as I'm suggesting and your imagination can begin to visualize some of the design details I'm proposing.*

Continuing our tour we pass the medium sized conference center of several linked buildings and enter the central double plaza, above which rise the tallest buildings in Anala, defining what is sometimes called an “urban room.” The northern plaza faces out over farmland. This somewhat larger plaza with a monument or sculpture of some sort slightly off center (maybe something like the one on page 66) is almost an “all city” experience: only the smallest hint of a view to the south and the main keyhole plaza is noticed from here. Otherwise, and in most plazas elsewhere, we are completely surrounded by buildings. To the northwest of this plaza is the Ecocity Institute with its own generous courtyard. Many of the buildings surrounding us are linked by bridges but notably not the buildings flanking the street to the south and the main keyhole plaza. Thus a clear unobstructed view lures the eye – and feet – toward the confluence of rivers, two plazas lining up to make a walking experience as well as viewing celebration of the confluence of the rivers.

Walk in that direction and we are noticing that there is a slightly high place in the street between the buildings that in the middle of that stretch of pedestrian street begins to slope gently down as we move south. This slight cut, fill and grading job gives us a view angled slightly downward toward the confluence of rivers beyond the keyhole plaza, typical for its type with larger structures rising to frame the view downstream. In this case it frames and celebrates the birthplace of the Manas River. What isn't typical is the religious structure framing the view on the left side, I should think a larger chorten though some other structure might be regarded as more appropriate, perhaps a small monastery shaped something like a more vertical dzongs and providing some administrative offices as well, in the usual manner. The northern end of the plaza has a spectacular, and I would say, very meaningful view speaking directly to the fullness of ecocity design in that it consciously relates to building a better future by understanding nature as well as we can. A very tall tree rises higher (might take a generation to grow) beside the iconic ecocity building that frames the scene downriver, perhaps a signature hotel featured on postcards visitors send home. The tree might be planted in an artificially raised planter, perhaps one or two stories high, to augment its height. Despite the intentional message behind this location, nonetheless, this is a place for pleasure, conversation and contemplation, with café, restaurant and various enticements for the “serious tourist” and those who have just come out of open curiosity.





**Keyhole plaza views, bridges and sheltering balconies (above)**

*Here our map is rotated 90 degrees to the right – north is on that side. The main celebrated keyhole plaza views are show in light green facing views generally south. I recommend quite a few pedestrian bridges, in red, many sheltering balconies, in orange.*



**Anala in a sketch with more finished buildings highlighted**

*Here we see the overall layout, downtown literally down the slope south and uptown up the slope to the north, upper right in the picture. Farms are between and to the left of the path/narrow road coming down the slope and sports area to the west.*



Sports and farm areas with religious structure (above)





The Anala Uptown area (previous page)

*Upper left a traditional looking complex larger building or set of them, perhaps governmental uses perhaps religious, and in lower right by the river, a hotel with elevated roof and guest and dining, bar and gift shops perhaps under the open elevated roof, splendid views everywhere. This is a kind of hot weather adaptation of the traditional country rooftops that were exceptionally high, providing room for much storage, keeping food and storage dry.*



### Downtown Anala-by-Confluence

*The building on the left, framing the view on the right from the keyhole plaza and down the Manaschu could be the other larger hotel or perhaps a commercial building in elements of traditional style. I'm imagining it would like to the buildings to its northwest with bridges that also serve, underneath, as rain and sun shelter circling the western half of the plaza.*

*On the opposite side, the chorten I've suggested earlier, or perhaps some other feature regarded to be important at such a site.*

*The building the upper right is the tallest in town but from outside Anala it only looks like the highest point in the "hill" that is the skyline of the small downtown. It is on the edge of the more insular plaza one arrives at from Uptown taking a more northerly route close to the farming open space. In that plaza there is an almost big city feel to the area around the plaza, but again, that impressions exists only in a very small area, then with minimal walking one is again on the edge with the surrounding openspace.*

Another way of visualizing skyline/height limits (below)

*The “hill” idea in a slightly different visualization. Also, the stippled area is the main confluence view plaza (you may need to zoom in) and rain and sun sheltered terraces and rooftops are featured in very light gray.*





Cross section of Anala's Keyhole Plaza area with ecocity features (previous page and zoom in for more detail below)

*We are here looking west with the Manaschu moving downstream to the left and off picture. Several "ecocity" features are described in the next two images.*



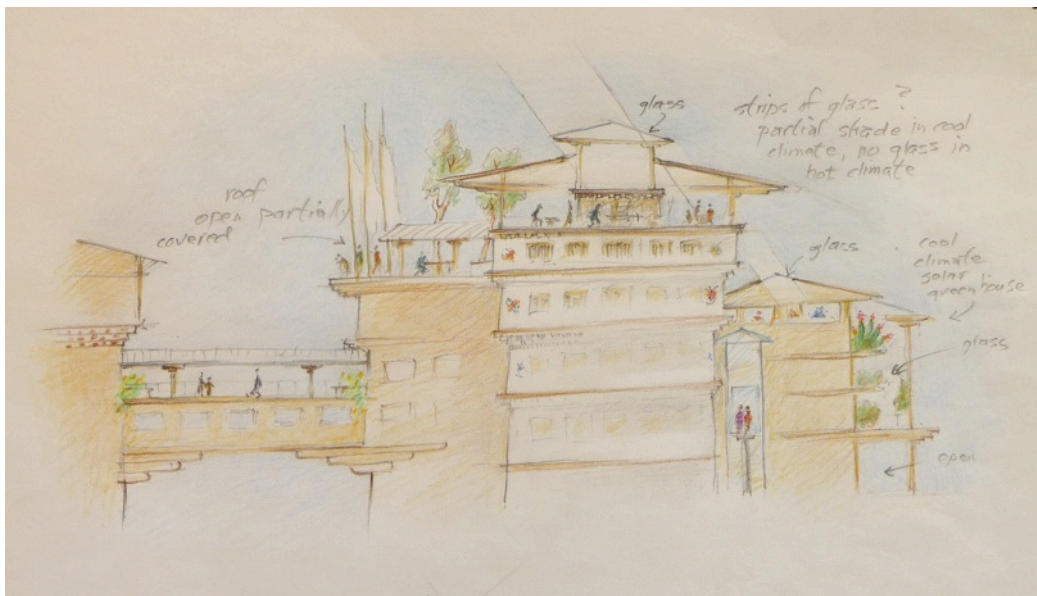
Ecocity features, 1.

*A monumental tree celebrated – along with the birds and insects it hosts – by lifting it up in a large planter box. Three bridges, the middle one with an “interior” lower level and covered but open upper level. The left one shows decks too.*



### Ecocity features, 2. a

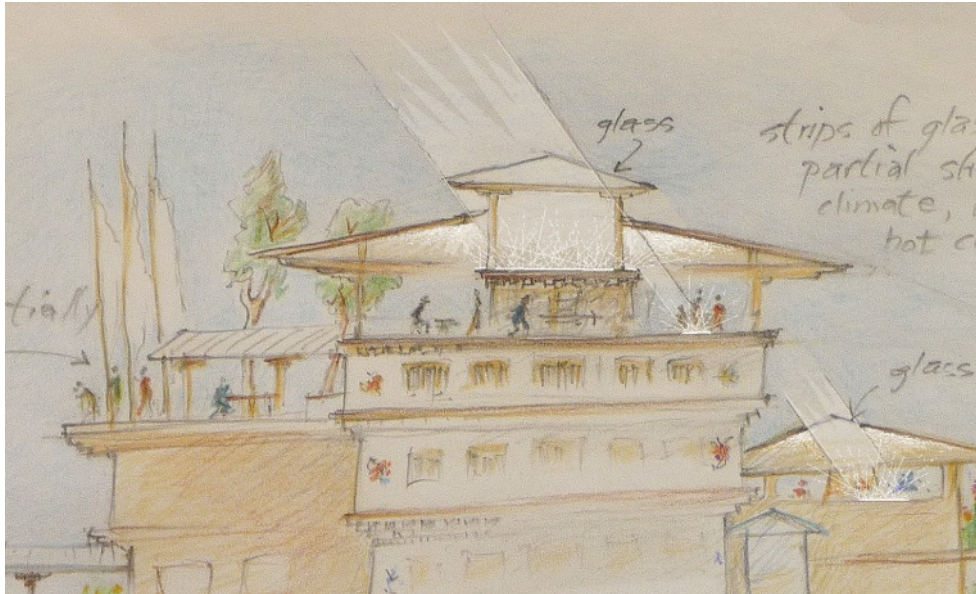
*In the middle highlighted building, the second roof is elevated high enough that the roof below it can be occupied for views, with the center part of the upper roof made of glass to provide some light. The two tall vertical box-like structures are external glass elevators – for safety and pleasure in moving in the third dimension. The long horizontal structure is a semi-transparent awning. The left highlighted building utilizes decks and also a glass-centered skylight. On the right, the building has a rooftop garden, both for food plants and decorative trees. The elements that are not so traditional, such as terraces and roofs that are open to the sky, so typical in urban Nepal for views, fresh air, solar hot water panels, picnic tables, plants, flags, restaurants and all related pleasures can be done with detailing in Bhutanese styles. I'd suggest though that the very tallest of the buildings keep with more strictly traditional function and appearance being most conspicuous in the skyline.*





Ecocity features, 2. b. (previous page)

*A closer look at basically Bhutanese style of rooftop accessibility for views and pleasant places for public gathering: restaurants, cafes, tourist and relaxation attractions. The idea is to have cheerful natural light in high places. The two level bridge is on the left, glass elevator toward the right and an attached greenhouse on the far right. In cooler climate it would have glass. Here it would be open, providing shade from floors and plants and fresh air.*



Ecocity features, 2. c.

*Moving in even closer we see here the way light from the skylights bounces off of surfaces and illuminates ceilings with soft, even light.*

### *Relationship between Tungkudempa and Anala*

We can notice a difference between Tungkudempa and Anala, Anala being more the ecocity show piece, Tungkudempa the more commercial arrival point. All places have their advantages and their uniqueness but these two, despite their differences, are both complete ecocities in facilities and functioning, but with their own specializations. The town at the confluence is after all, at the confluence. The other, at the commercial entrance along the new national highway, whose bridge across the Dangmechu, the Niishoka Bridge that connects points both east and west across almost all of southern Bhutan, opened while I was writing this report in Oakland, California: mid June, 2013. Dungkudempa is more like the business center and port of entry with perhaps crafts and farm tool making and agricultural products processing and shipping. Anala is more the intellectual, cultural and eco-tourist center with some significant emphasis on sports. If activities at Anala seem more special, rents are lower no doubt at Tungkudempa, maybe the incubator in

the valley for young talent in business and for artists on their way up and deeper into their work. Besides which, and especially in the apartment context with rents instead of long term ownership obligations of the single family home prevailing, social and economic mobility is likely to be facilitated – that is, one can always move about and try living in different locations in the valley and on our two “platforms.” That’s mobility of being in place, a healthy form of mobility as compared to the mobility of constantly moving around commuting in a transportation vehicle from one place to another.

### *“Ecocity fractal” in the larger “ecotropolis”*

A last comment for this longest section of our paper, the part on proposed ecocity layout and design features: Many elements of an ecocity could be exemplified and the functioning of a very interesting town could be conceived and illustrated without the densities I’m suggesting and without the farms adjacent, and without consideration of the variety in the whole Panbang Valley that begins to model a small scale “ecotropolis” in its potentially healthy bioregion. But what I’m offering here is complete. It is not just some of the features of an ecocity brought together.

Among those of us who have been developing these ideas over the last 40 years we have been using the term “ecocity fractal” for about ten years and long before that, the same notion under the term “integral project.” With both those terms (introduced originally herein on page 9) we mean all the functionally essential components of an ecocity are present and well arranged. Nature’s lessons from the form and functioning of living complex organisms and ecological relationships between organisms and their environments are taken very seriously. Respect is expressed and activated for both nature and agriculture in the wholeness of the idea, and the reality that we all live in biologically powerfully influenced regions – “bioregions” – with their own special patterns. Respect is also expressed in the design and activated in the lives of those living in and visiting the “fractal” or “integral project.” Simply to live here is to far better conserve energy and land, reduce consumption, recycle much better, and so on, and even learn passively as well as actively. For example, the architecture teaches as well as cools and air conditions passively just because of the way things are designed and built here. My message – and something of a warning – on this subject is this: “as we build so shall we live.”

I travel very broadly giving talks on ecocity ideas and have explored many dozens of cities with my camera in hand, looking for such complete projects as speak clearly to the ecocity whole town. Yet I have found not a single place where all the parts come together. Many have quite a few elements assembled. None are complete. Yet in only a few blocks, perhaps as few as three or four blocks, it is possible to assemble, in good relationship to sun angles, local climate, views and basic work and “happiness” components, to design and to build such a place. We’ve heard of the parable of the blind men and the elephant, the men not able to



grasp the whole because for them it was not complete, the trunk felt by one man to be like a snake, the tail felt by another to be a rope with a big brush end, the leg by another to be a tree trunk and so on. Without completeness they had no idea what it was they were experiencing. At last, and a message to the world as well as functional benefit to Bhutan, there would be such a complete and functioning small ecocity. Two of them in fact, thus also showing a variety of ecocities is not only possible but what should be the usual, the normal, the healthy.

### *Lessons for an urban world*

My ultimate purpose, and I should think Bhutan's in building an ecocity, especially at the place where its two largest river merge and give their waters to the rest of the world, is the successful confluence of ecocity ideas with the initiative so unique (unfortunately!) to Bhutan, the GNH effort. The objective is to help an extremely heavily populated world in which humans have expropriated practically all of the "primary photosynthetic product" of soil, sun and plants laboring through the chemical magic of chlorophyll to bring life to a whole planet. Simply stated, the lessons here, if they seem a bit extreme in the context of the Bhutan of the past, are for everyone, to help solve all of our problems, not just for Bhutan and a few of our problems one at a time. Start talking about happiness and that's where you go!

### *Thimphu*

When I agreed to accept the challenge to design an ecocity or two for Bhutan, from the start I'd heard "it's already too late for Thimphu." I heard this from many people. When I arrived I understood where they were coming from. Big buildings scattered way up and down the valley, delicate, twisty and dangerous looking scaffolding everywhere as new buildings were being added seemingly almost randomly about the landscape. Perhaps in what I've read the best summation was from John Elliot who interviewed the Fourth Druk Gyalpo, Jigme Signye Wangchuck in 1987. He expressed his recent observations in an interview by Gyalsten K. Dorji originally in the Thimphu newspaper Kuenzel, and later published on May 28, 2011 in Fortune Magazine.

Asked about what had changed between 1987 and 2011 Elliot had this to say: "The way the buildings are spreading along the hillsides, along the valley, is in a way awful because it's a sign of what's happened to the hill stations in India. I think the thing that I've been struck by is this great debate of what you do to this place to keep it as it is, and will the young generation who may be rebelling against it now and wanting the benefits of the consumer society, be converted, as they get older to the benefits of Bhutan. I think that is the main issue. What strikes me is the Westernization, the consumerism, but alongside that, this continuing

debate. And it is fantastic to have a country, which is debating this. I've lived in India for many years and there, things are just allowed to happen. There's no planning, as one has seen with all sorts of things, it all just happens. But here, you're trying to plan, here you are really thinking of the future, there is a debate, I sense everyone's involved."

My diagnosis: Thimphu is suffering badly from the influence of cars that are scattering the city across a very large area. The city population is growing fast, but that might also suggest that there could be more than one city of modest scale in Bhutan, that smaller cities could take up some of the farm-to-city migration and attitudes may evolve to bring some of the excellent aspects of city life to the country – the small ecocities of Tungkhudempa and Anala might show the way. But specifically I'd say for already largely damaged Thimphu:

*Find the centers, enhance their density and functional diversity*

This is my usual recommendation for any existing city already contaminated by and thereby already scattered thither and yon. It is very hard to do since people, the highly mobile and thinking themselves somehow liberal and flexible, almost always prove to be very stuck in their car-dependent, single-family-house ways. True, more people are discovering the virtues of urban living in many parts of the world, but the vast majority are either still sticking with their automobile addiction, as in the United States today, or hope passionately, as in China, to become serious users of cars and conservatives anchored to a piece of private land and property.

*The "success" component*

Concerning the attitude mentioned in the above paragraph, we need models of successful people who chose to live and raise children in the higher density centers of cities, which can be smaller higher density neighborhood centers as well as district centers and downtown centers. I noticed children were playing in the schoolyards, alleys, vacant lots and parking lots of Thimphu in higher density areas. But I also noticed that the more successful people I met – in terms of respected and higher paying jobs – bought or were renting houses or apartments farther from the centers and all had cars.

Meantime the present scattered car-dependent city is bringing on problems so gigantic most people refuse to acknowledge the connection: climate change, species extinctions and so on. In the face of this we need people dedicated to planning for and moving their lives – and taking their children with them – to the higher density centers. They need not only security there but stylishness. When they become more successful and can afford "better living standards" they should be encouraged to invest in making the centers better, not taking their private wealth off to a car-dependent place. It would be enormously helpful if we all helped make city life styles "stylish," consciously support "green" as "in," as if

life in cities could be responsible and life supporting – which they can if in the ecocity mode.

People will always differentiate according to wealth and tastes and the wealthier ones in cities will generally have larger spaces to live in and usually higher in buildings for the more expansive views if they choose apartments or condominiums. Once they understand ecocity concepts and engage their imaginations they can take effective political action and devise financial support schemes for making the centers better in the ways suggested by this paper, including shifting the kind of public investment in automobile infrastructure over to making the centers more affordable and beautiful for everyone. For example, governments can meet public “demand” by extending the road system outward and paying more for its maintenance, police patrols, stretched water, gas, electric and sewer lines, or instead spend on investing in public places like parks and plazas in the city. And “successful” people moving into the centers, large centers and small, can “demand” that their urban environments rather than suburban environments be improved and the countryside be maintained as farms, productive forests and natural landscapes.

### *Car-free? Good idea.*

I happened to be in Thimphu on June 5, Pedestrian Day, the city’s idea of what would be a good thing to do on World Environment Day declared in Stockholm in 1972 at the United Nations’ first environmental conference. It is absolutely excellent that people should experience car-free environments and times and exercise their feet and minds on such occasions, and all occasions, actually, to think through the implications of continuing down the car street and highway as compared to the routes for people of foot, bicycle and public transport. It was discouraging to hear car-free Tuesdays were given up under democratic citizen and commercial pressure so that people could make a little more money – the assumed reason, anyway. But that can change if people think ecocity ideas through with some consistency and commitment to solutions. (Curitiba, Brazil discovered that once people got used to their many new pedestrian streets – 26 blocks of them were closed to the automobile – that businesses did just as well there as when cars streamed by shops’ front doors.)

The physically embodied form of this is turning parking lots into plazas for foot traffic and artistic expression, bordered by shops, cafes and the like. Then, over the years as other infrastructure changes come about, those car-free areas should be expanded until cities, towns and even villages are reshaped for human beings instead of cars.

### *A cog railway special center or two?*

Thimphu already seems too scattered to be easily and efficiently served by public transit and is hilly enough to be difficult for all but the strong on bicycles. And, obviously, when a city becomes packed with cars they are a hazard to

everyone using any form of transportation, especially dangerous for pedestrians and bicyclists.

The approach that finds vitality centers and augments them with more development but of a far more “balanced” “mixed use” sort is difficult but must be attempted and actualized in knowledgeable ecocity design, even if gradually. One very specific idea to serve as both well-functioning communities and models for everywhere else would be to find a new center or two up a side slope or canyon, perhaps on one of the less precipitous hills overlooking the Thimphu area and served by a cog railway as are some towns in mountainous countries, notably Switzerland. The car-free city of Zermatt, served by such a railroad, is something of a model. With a focused set of policies creating a mainly tourist and perhaps educational set of facilities and functions and maybe a Buddhist retreat on the quiet side of such a development, a small ecotown could be created that might be popular and a physical presence for the idea in the capital area. Cog railways are relatively slow – maximum 25 miles per hour – but generally a pleasure to travel in and the views are usually spectacular.

The idea would need commitment and would be part of the international outreach pulling the ecocity and GNH ideas together right along with the efforts in the Panbang Valley. The effort would have to be sustained long enough to create a center of enough activity, population and vitality to be successfully maintained as a viable built community with satisfied residents, workers and visitors. Being very close to the country’s portal to the world – which is Thimphu more genuinely than Paro – such a model ecotown could be very important, almost a sister town to the twins near Panbang.

Perhaps most importantly, along with the idea of steadily expanding car-free areas, such a new eco-town could help model the small scale centers that might develop in Thimphu itself if it can do the near-impossible and start shifting its development pattern away from automobile scatterization and toward pedestrian centers.

## *National policies*

Ultimately we need to design policies at the same time we design cities. Currently many policies are blocking ecocity development because very few people have been thinking through the implications of ecocity design as yet. Ecocity ideas have been around long enough now to be almost traditional in some circles but so far the victors rising from the battle are the automobile manufacturing companies, the oil companies and highway paving and parking lot building industries and their managers, employees and professionals. Then there are the car insurance people, the police that spend about half their time and money controlling traffic instead of enforcing criminal law and so on. Then there are the



citizens. And almost all the above are convinced nobody is really a modern accomplished person who doesn't own a car. For example, I was talking with a Chinese man in a Beijing taxicab about the problems with cars and he said, "Well, if I can't have a car how can I get a wife?" Only recently have the beginnings of a movement back toward the city centers been getting started.

### *The virtues of monarchy*

One of the discussions in the political arena in Bhutan that I believe is profound in this regard is part of the thinking associated with the happiness standards. You won't find monarchy advocated as a virtuous system in many places these days but in Bhutan there has been enormous respect for the five kings since the country was unified in 1907. When the Fourth Druk Gyalpo suddenly and without prior public discussion abdicated to his son in 2006 and established a democratic system with the Fifth King something like a powerfully influential figurehead, the country went into a panic. Nobody trusted democracy and many critiqued the system saying it would bring out the selfish, acquisitive and irresponsible side of "the people." Under a king there could be more stability with people knowing their places and fulfilling their various duties – including the King. But Jigme Singye Wangchuck said he trusted the people of Bhutan and believed it was time, during an extended period of peace and general satisfaction, to turn the real political power over to the people. He praised the past monarchs of Bhutan and agreed that a good king could make for a good system, but if a country happened to get a bad king, and power does tend to corrupt, as the saying goes, and absolute power absolutely, meaning with absolute certainty, with some kings a monarchy could produce a real disaster. But the Fourth Druk Gyalpo said he would trust the people of Bhutan and give them a chance for their wisdom to shine through.

I've noted and so have many others that democracies make all efforts to have and defend rights, but there are no Bills of Duties to my knowledge. Some responsibilities are assumed, such as to pay reasonable taxes for the common good and to maintain the services the private profit sector can't cover properly including police, fire, defense and the making of the law. But the emphasis is on the rights and the Bhutanese were – and many still are – very worried that their cherished traditions might be threatened by the individualistic freedoms, especially freedom to consume thoughtlessly, that seem to be coming at the risk of their religion, stability and relatively high levels of satisfaction.

Ecocities figure in here, though, as providing a means to very healthy development in that their study delineates a clear set of things to build and do if we do assume responsibility along with personal freedoms. We can actually think thorough what it is that should be built as the foundation for making economic investment and management decisions, a theme I'm exploring in my current writing on "an economics built on what we build." It amounts to a disciplined, restrained, but very richly culturally, materially rewarding way to build for a

prosperous but not exploitive, greedy, profligate way of living. One critique of the set of ecocity ideas I heard several times was that, “the people will not want to live in such more dense centers.”

Besides pointing out that thousands are flooding Thimphu from isolated farms to do just that, when our exploring party trudged out on the Tungkudempa and Anala platforms and returned on that very hot sunny day we got a good example of what really does seem to happen. We were hot, sweaty and tired so we dropped in on a roadside farm house and enjoyed some cold bottled water in the shade of it's overhanging roof. As we approached we heard gunfire and screaming. It was an Indian melodrama, people murdering one another, on television and the violence, tears and pathos went on for ten minutes as we tried to relax. The whole family, old and young down to a toddler around just two years old, were gathered around transfixed, looking at the cultural product they bought as soon as electricity made its appearance. For better or worse, people gravitate to the new, world-connected realities, largely because we are a curious species. And the young will always want to try out new things and travel, though they often will want to return as well. So I really don't see the arguments that the alternative of ecocity living will interest no one. It can be a curiosity, captivating, in style and actually very meaningful – and a whole lot more responsible and uplifting than staring at television. It is a better alternative among the many now being offered, especially the ones that are not built on ideas of happiness but rather consumption, distraction and irrelevance or even damage and violence against the future.

Without getting into human psychology at this juncture approaching the end of this paper, I can say the above as background then make some specific observations about policies.

### *Zoning and ecocity mapping*

Of the laws that impact city design and building most have to do with zoning. And many zoning codes work powerfully against ecological design and city building, for example the ordinances in the United States that require large amounts of parking for any particular set of urban functions called “land uses.” Another example: low height limits have tried to bring into the city context country ways of living. That's not a good idea since low density is an integral part of the whole car, cheap fuel and paving total infrastructure.

Most zoning presently works in general ignorance of what diversity of functions facilitate, that is doesn't address much less encourage such built items as terraces, pedestrian bridges and other ecocity features. For this reason among others it is hard to actually build ecologically healthy towns. FAR – floor area ratio – that formula that planners take as gospel with no serious questioning tries to open up the ground level of cities to sunlight by requiring more open space immediately next to a building the taller it gets. This is all very well-meaning but it is based on the kind of streets where most of the traffic is vehicular and mainly cars. Take the cars out and make the street for pedestrians and not nearly so much

space is needed. Without the noise, smells and hazard of motorized traffic narrow streets and associated smaller but interestingly configured open spaces can be like semi-interiors, in which case FAR becomes totally meaningless.

In any case, zoning needs to be crafted to produce ecological cities and one of the most important things to do in support of ecocity zoning is the making of “ecocity maps” that are future-oriented maps that identify the centers of most vitality in a city, town or ecotropolis region, and help us focus more development, but even more importantly more functionally diverse development in those centers. The basic requirement is to do a good job identifying those centers and staying committed over many decades to a series of changes that cause such centers to become real ecocities, ecotowns and ecovillages in their own right and as they do, open spaces form around those centers where paving and low density development used to reign. Following such prescriptive and future-oriented mapping provides a way to liberate millions of acres from asphalt and concrete paving. Following the prescriptions of such mapping vastly reduces energy “requirements” for running cities, and thus reduces and even could reverse global heating and climate change.

In countries I’m familiar with zoning is the prerogative of city governments but state and national government have strong influence through building codes and standards, demands by agencies responsible for traffic control, water quality, commerce and so on, and allocation of tax money to projects that directly help shape the cities laid out largely by zoning. It is not a very pretty language but generally fair in that zoning generally doesn’t change very rapidly and thus both developers and the citizens of cities can understand and function within zoning’s only slowly changing rules. My main point here is that zoning can be designed to be powerful in shaping ecologically healthy cities – or preventing them from happening.

### *Transfer of development rights and imminent domain*

There comes the inevitable confrontation between existing land holding rights and the necessity for changing our infrastructure. Many in Bhutan have told me that now that the country is a democracy if people don’t want to change land uses and sell their property for the public good you can’t do anything about it. This can’t be true in all cases or dams and highways couldn’t be built, but the statement does show that it is difficult in Bhutan as in other places to consolidate land for ecocity projects despite strong rationale for the public good from such projects – and happiness into the future – *and* benefit for the natural world.

In the United States a few localities use “willing seller deals” and various forms of community pressure including neighborly and family approval or disapproval to encourage people to sell property for community benefit. For example in an area of Portland, Oregon along a large creek with the flow of a small river called Johnson Creek a zone was designated to be an area where anyone willing to sell their property close to the creek would receive payment comparable to the value of nearby houses of the same size and quality. Over the

next 20 years more than 150 houses were purchased and removed using flood prevention and mitigation moneys from the Federal Emergency Management Administration (FEMA) and storm water mitigation money from the city government. In their place there is now a natural watercourse with natural environment on one side teaming with local species, some of them rare, and on the other side, some of those species, plus people on foot and bicycle commuting into the downtown area of Portland or just out to get some exercise or enjoy the environment.

Another similar arrangement, also based on willing seller deals, is called a transfer of development rights (TDR) or also know as transfer of development credits. This approach is based on land holdings secured by deeds that enumerate various rights, such as the right to farm, rights to the waters flowing through and under the land, rights to mine, rights to develop roads, put up fences, build buildings and whole communities. A deed to every possible right is called a fee simple deed – keeping the description simple by simply stating all rights are granted. The idea is that a landowner can sell the rights to develop and have those rights stripped from the deed; he or she will then never be able to develop more than is already there. For instance say a farmer could sell to a developer and make two million dollars, more than farming would produce in the next five years. The local laws would allow the developer to buy the rights from the farmer and build equivalent floor space, road, sidewalk and landscaping and buildings of a community development project in a designated area, which would be development in addition to whatever would be allowed in the prevailing zoning code. Say if there were a three-story height limit there, the developer buying the development rights might exercise them by building up to six stories. Thus a town could place development carefully in one place, often for good environmental and economic vitality reasons, while at the same time keeping the farming or natural landscape intact as such. There are now several hundred such local ordinances on the books not only preserving open space while placing new development in carefully targeted locations, but also protecting historic buildings and districts while making way for the new at the same time in a better location.

I'd recommend this approach be crafted as an option for Bhutan in assembling land for ecocity development.

But what happens when a landowner refuses to sell under any circumstances yet the community is convinced it has the common good at stake? The alternative is application of eminent domain laws – condemnation and forceful purchase of the property by public moneys so that a project can move forward. I will put forward the notion that such a move seems drastic these days in democracies that give very strong property rights to individuals, often to the detriment of the common good, or at least to the detriment of disadvantaged people and overlook ecological environments. But it should be said, controversial as it might be, that we need well thought out and promising solutions to drastic problems that descend from highly destructive urban infrastructure of the wrong



kind. At present, flooding valleys for hydropower projects and building highways are seen to be proper rationale for appropriating property. In the era of rapid freeway building in the United States, from the 1950s into probably the 1980s, when people believed deeply in mobility being right, just, beautiful, fun and the wave of the future, there was relatively little resistance to government purchase of real estate for highway development. It was an item of cultural consensus. Displaced people simply took their money and exercised a little flexibility (assuming their financial compensation was fair – sometimes it wasn't and sometimes it was generous). Similarly I argue now for a cultural consensus based on understanding just how problematic – a serious understatement – our present car-based way of building cities has become, and just how promising and large the solutions of moving vigorously toward ecocity development actually is.

### *Planned unit developments*

Planned unit developments, ungracefully called PUDs, are a way around zoning codes that block ecocity development. This is another example I know of from working as a citizen planner, meaning a planning advocate in the public realm, in the United States. The notion is that if a total community development plan, such as a retirement community or a gated community inside city limits or under country jurisdiction doesn't fit the code but can show that it definitely benefits the values espoused by the community and advances the community's quality of life or economic targets the zoning code can be overridden there and the project can be built, essentially as an actual improvement of the zoning situation. An ecocity community would have all such rationales in order.

### *Mountain tourism*

I came to the Himalayas for the first time – Kathmandu and the Annapurna region – mostly to see the stunningly beautiful and majestic mountains. I came back two more times as a cultural as well as mountain tourist, but also as a participant in city planning meetings in Kathmandu. By the time I'd experienced Bhutan I realized I was exceptionally happy with the traditions of the people, the people themselves, their architecture and the generally very mountainous whole country. In addition there was the excitement of dealing with things I care about which I am writing about here in this paper... and, I realized as I was about to leave, that I hadn't seen the snow peaks at all and was completely happy anyway.

That having been said, a visit to Dochula (despite the obscuring clouds) and familiarity with the map of Bhutan, including extensive fly-overs with Google Earth, and I believe that careful mountain tourism fused with ecocity design of small communities could become a significant part of Bhutan's future economic strategy and play a major role, like the development of Dungkudempa and Anala, in bringing ecocities as well as GNH approaches to the world.



### Zermatt, Switzerland

*Zermatt is a compact car-free city in the Swiss Alps that provides a few good ideas for Bhutan.*

The snow peaks of Bhutan are almost as high as those of Nepal and equally gorgeous. They are difficult to get to due to the extraordinarily rugged somewhat lower mountains of Bhutan. But if there were a few small thriving and highly appreciative eco-tourism centered towns with views of some of the spectacular snow peaks these too could be well-functioning influential ecotowns. They could be sited to include some of the temples or chortens in the view, which are in their style and quality unique among the mountain systems of the world. Or perhaps such religious features could be created new to bring cultural and nature focused tourism together.

Zermatt, Switzerland, though a little too large and too tied in with large scale rather than careful tourism for the Bhutan situation, could nonetheless offer a number of specific features as examples worth studying. Zermatt is accessible by motor vehicle only by a cog railway and it is completely car-free. It has been thriving since about the 1870s. Roads typically sprout almost random new development anywhere cars and trucks can pull off, but rail lines are station-to-station transport systems that encourage the centers-oriented patterns, like the line that goes to Zermatt. Therefore rail access is generally far less disruptive to landscapes than road development and thus a key to healthy ecocity development.

Bhutan's mountains are almost ten thousand feet higher than the Alps and thus a world draw for people who love mountains. Zermatt's mountaineering and skiing mar the area's higher slopes to a degree that Bhutan would do well to avoid, instead focusing on the juxtaposition of the cultural tourism that already exists and the natural landscape and biota of the region for contemplation, respect and inspiration. But Bhutan, in its evolving tradition, could apply ecocity design and planning to its approach of careful tourism development.



### Bioregional Sculpture

*A drawing of mine from the 1980s of local animals in my area of California. A sculpture like this but with local animals, perhaps including the amazing hornbills I've seen in Panbang, could grace one of the plazas of Anala.*

## *Recommendations and next steps*

I've now presented important principles and many details that could lead to small ecocity projects in the Panbang area and perhaps apply to Bhutan's city plans and economic strategy for long term very careful development. Now I will review my major recommendations in brief.

1.  
Take very seriously ***the importance of pedestrian car-free and centers-oriented development*** and the healthy articulation of higher density at high levels of functional diversity ***close to open space*** preservation.
2.  
Assume the attitude of ***happy exploration and experimentation*** in the design and development of the two small ecocities in the Panbang area with the goal of producing a place with strong emphasis on the design features described herein.
3.  
Keep in mind that ***traditional styles*** of surface treatment of buildings, and in Bhutan's case, even a number of traditional major architectural and community design features such as wide overhanging roofs and the esthetics and multi-story function of the tall dzongs, can harmonize beautifully with ecocity design. To assure this, involve architects with deep knowledge of traditional architecture and ***with minds open*** to the idea of exploration into new possibilities in careful development in the Panbang area project, in Thimphu and in determining national development strategy.
4.  
Establish the ***world's first Ecocity Institute*** on a track to becoming either a model for or an actual ecocity college or, eventually, university.
5.  
Keep ***agriculture*** in the Panbang area alive and healthy and seen as in close association with the new city designs there: agriculture preserved, actively very useful and ***integrated into the economy and highly honored***. Studies of organic agriculture in that region might be one of the emphases of the Ecocity Institute and a field research laboratory might be established and evolved in connection with some of the local producing farms.
- 6.



Establish a strong “*serious tourism*” element in the national economy and there at the Panbang project site, oriented partially to the Ecocity Institute (possibly on its way to becoming an ecocity college) as well as oriented to the Royal Manas National Park.

7.

Encourage and provide for *sports activities, especially participatory* and that relate to the rivers and natural environment in the area; consider meshing winter training at the location with winter vacation in the cooler regions of the country.

8.

Establish several small to *medium sized hotels* in Tungkudempa and Anala and a very small hotel or two in Panbang, somewhat expanded shops there but no new building other than for farms outside the central area of Panbang.

9.

Develop tools to help in consolidating land for ecocity development such as *willing seller deals, TDR and use of imminent domain* well reasoned for the multiple benefits of ecocity development; make sure ecocity ideas get into the general educational system in a way similar to and complementary to the materials on GNH.

10.

*Strategize* with the author of this report to plan support for next steps with *realistic funding/financing* from foundations, international financing and grants programs and investment of some of Bhutan’s government wealth in ecocity development.

11.

*Create a team out of the Works and Human Settlements* Ministry and under its Secretary involving the author of this report resenting ecocity history, knowledge and long-range design and planning. Include also ministry designers and planners and architects versed in traditional and innovative new approaches that might be selected and applied. The author knows several people such as the world’s expert on transfer of development rights and some of the most creative architects and “natural carbon sequestration” strategists.

12.

*Better survey information required.* This report was written before accurate surveying was complete and the actually height of the landscape above the waters of the two boundary rivers was determined. We need more accurate information.

13.

A discussion ensued about the pace of the Dungkudempa/Anala project and the idea of starting small and ***phasing in larger more ambitious structures*** into the future so the town might grow gradually as is often traditional. Smaller, inexpensive buildings and those made of exclusively locally provided materials would seem appropriate on the “farming fringe” and somewhat later the larger buildings could be constructed in the areas predetermined in the layout. In the very different future, who knows how the communities might grow ***but*** I do have this to say: ***we live in crucial times demanding action right now***. It is already late for many disasters well along toward very serious biological and resources collapse and yet we still have the wealth, technology and genius to invest before a general crisis hits. We should not squander the powerful insights of the GNH initiative and the ideas of ecocities but apply them on a national, even world emergency basis. I don't believe there is anything more important to do.

14.

***Branding is OK if connected to genuine features*** of a culture and Bhutan's “branding” has been successful and provided economic bonus and intellectual other perspectives in its careful application for several decades now. If ecocities and GNH come together we still have the old brand with some new elements, maybe the parents of the combination to make a world leadership difference. Happiness may be a place but it is also a physical form and very serious mission.

15.

And a last detail: if there should be general agreement of the potential for ecocity development as a benefit to mankind and nature alike, ***the King and the democratic government should make a joint announcement that ecocity design and development has become a sister initiative to the efforts of the Gross National Happiness initiative*** to improve the health of the planet – starting at the confluence of the two ideas and the confluence of Bhutan's two largest rivers.

Thimphu pedestrian bridge (following page)

*Probably my favorite bridge anywhere, though with no smaller waterways to cross at Dungkudempa and Anala, not appropriate there, but a reminder of the beautiful things that can be built with Bhutanese sensibilities. I would hope that the details, some planned, some to evolve in ways we know not, will be similarly inspired at our new ecocities joining GNH and the confluence of two rivers.*







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