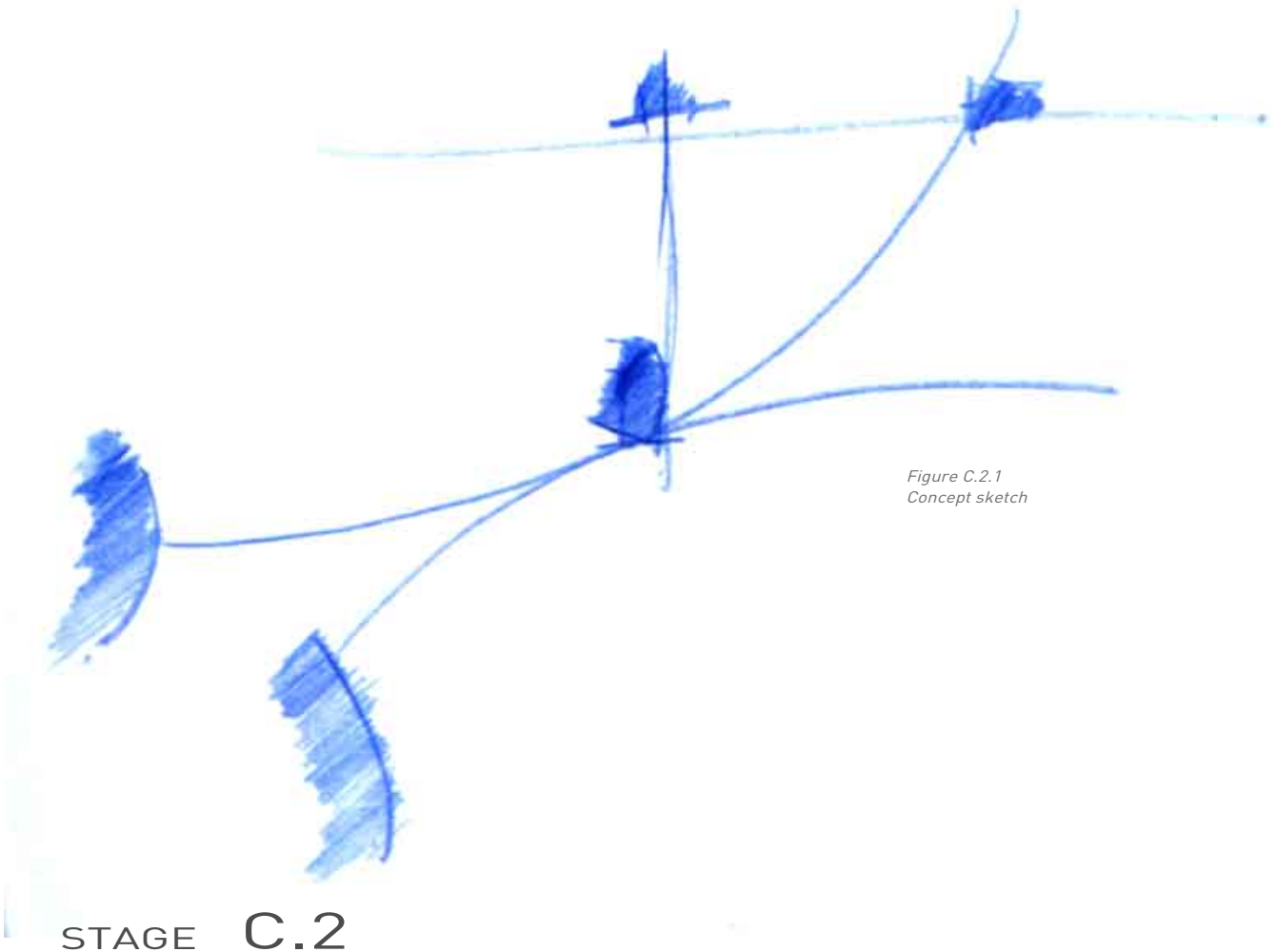

Figure C.2.1
Concept sketch

STAGE C.2

Spatial Framework

C.2.1 INTRODUCTION

It is important to realise that there are great benefits from inter-cultural relations. Thus there is a need to define the opportunities required specific to these cultures.

There are primary cultural needs within Pretoria's urban context to maintain or improve the quality of an environment when cross-cultural integration takes place.

What is urban design?

- Urban design is about links and common ground, about teamwork and collaboration.
- Urban design is about the design of communities as opposed to the design of either buildings or gardens as individual entities. It's about projects that focus on the relationship between people and cars (transport systems), between buildings and open space, market forces and public policy, and it's about listening to the community. The collaboration of team members with diverse backgrounds is essential to successful urban design.

Department of Landscape architecture 2002,
LOW410: lecture 1:2

The primary elements of spatial structure

The primary purpose of the structural system is to achieve sufficient clarity to guide the process of urban development.
The primary elements which make up the spatial structural system and which are the subject of necessary management actions are:

1. Regional Open Spaces
2. Site Making Actions
3. Activity Systems
4. Public Facilities
5. Urban Spaces

Dewar & Utenboogaardt
LOW410: lecture 1:2

Urban needs

From an urban management of South African cities perspective, there are four sets of needs which are particularly important and which need to fundamentally inform the management of growth:

- URBAN GENERATION

People come to cities in order to experience the economic, social, cultural and recreational opportunities and facilities which are generated through the physical agglomeration of large numbers of people.

Of particular importance in developing countries, where rates of urban growth are extremely rapid and there are high levels of poverty and unemployment, is the need to generate opportunities for small-scale, self generated economic activity (around proposed transport node and on Church Street spine).

Dewar and Uytenbogaardt 1991:16

- ACCESS

The second need is ease of access to the opportunities and facilities which exist (Inner-city, Church Street and the Pretoria-west shopping node). All urban inhabitants should enjoy relatively easy and equitable access to urban opportunities. This concern with equity should not be confused with a naively utopian longing for equality. Inequality and contradiction always exist but the pursuit of constantly improving levels of access to opportunities is an achievable direction.

When ease of access is reduced it reflects a fundamental problem of urban form. Form becomes impositionary: it demands the use of time and personal resources. The effect of the imposition is magnified by poverty. The marginal cost of overcoming access-restricting barriers, of which distance is one, for the wealthier is low while the equivalent cost to the poor, is very high. The concept of access has both spatial and a-spatial dimensions.
A central role of appropriate urban policy should be directed towards breaking down the economic, political,

regulatory, attitudinal and other barriers which prevent people from fully entering, and participating within, the mainstream of urban life.

The spatial implication of this concern with ease of access is inescapable. The primary physical barrier to ease of access is the cost of overcoming the friction of distance. The best situation is obtained when people can gain access to the most necessary daily activities on foot. Indeed, for many, it reflects the only feasible option. Movement on foot, therefore, should define the primary scale of urban development.

Obviously, however, this mode of access does not cover all situations. The entire point about urbanization is that with increasing agglomeration, higher orders of opportunities, activities and facilities can be supported. If the urban poor are to gain physical access to these, however, an efficient, viable and co-ordinated public transportation system is a pre-requisite. The reality is that, in most cities in developing countries, of which South Africa is one, a large and increasing proportion will not be able to afford personalised motor transportation in order to gain access to urban opportunities and facilities. The degree to which urban living is dependent upon the car defines the degree to which the poor are spatially marginalised and materially impoverished by city form.

C.2.2 THEORETICAL APPROACH

The parts that make up the whole.

Urban scale: the sense of the whole.

> In discussing design by element types, there is a tendency to skim over the interrelation of the parts into a whole. In such a whole, paths would expose and prepare for the districts, and link together the various nodes. The nodes would joint and mark off the paths, while the edges would bound off the districts, and the landmarks would indicate their cores. It is the total orchestration of these units which would knit together a dense and vivid image, and sustain it over areas of metropolit scale.
>
> Lynch, 1960:108

According to Lynch, the five elements:

1. District
2. Node
3. Path
4. Edge
5. Landmark

Sequentiall sense of the whole in concept:

1. Pretoia West link to Pretoria inner city and outlying Pretoria suburbs. (Attridgeville, Soshanguve, Laudium)
2. Kwagga center / Church Square
3. Church street / residential spine (Buitenkant street)
4. Western edge extended to include Constitution hill
5. Power station

C.2.3 CONCEPTUAL REGIONAL LINKS

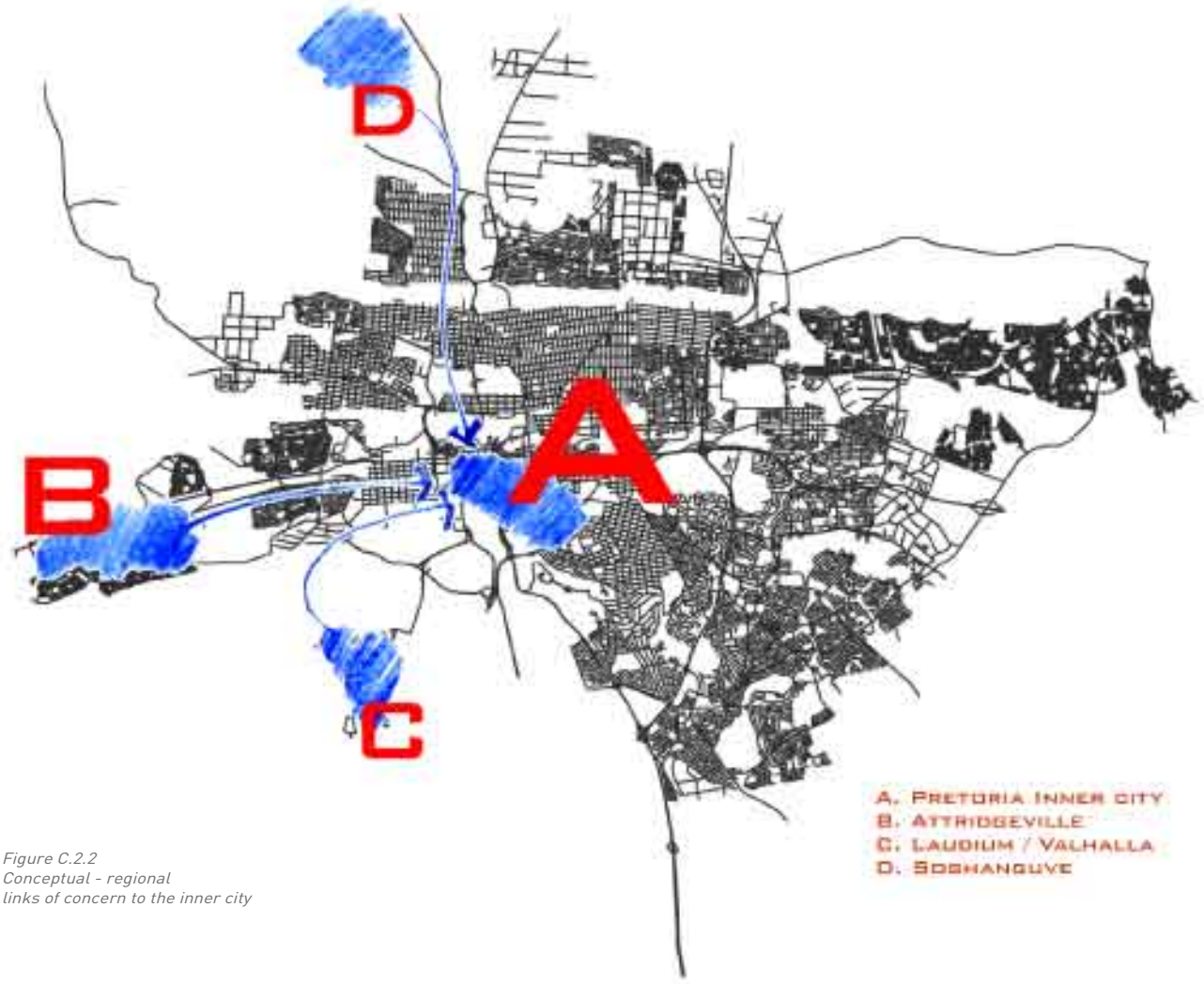

Figure C.2.2
Conceptual - regional links of concern to the inner city

C.2.4 CONCEPTUAL CITY LINKS

- Promotion of collective activities and contact

This relates to the promotion of social contact and interaction. The very motor of urban development is innovation and diversification and these, in turn, are dependent upon exposure, social interaction and communication. The places of greatest interaction in cities are the places of greatest opportunity. The way in which urban environments are built can either promote or retard both formal and informal interaction and communication.

It follows from this that appropriate urban management strategies should focus on the collective activities of urban life and the need to accommodate these, rather than on more private needs.A second awareness, which is subsumed under the heading of social contact, is recognition of the importance of social ties and networks in urban life.

Dewar and Uytenbogaardt 1991:17

- Individual needs

These must be met for people to engage fruitfully in urban life. These include physical needs (nutrition, health, safety, shelter, potable water, adequate sewerage, employment and so an), social needs (opportunities for social interaction and community ties - transport node, Church street, Shopping node, residential spine, awareness centre), psychological needs (security in all its forms, identity, a sense of belonging and a sense of individuals being able to affect their awn destinies) and sensory needs (exposure to stimulatory, learning environments - Awareness centre).

Dewar and Uytenbogaardt 1991:17

A. Pretoria Inner city
B. Existing Pretoria central rail station
C. Exisiting Belle Ombre rail station
D. Existing Electro rail station
(to be upgraded for disabled/trolley access)
E. Conceptual Pretoia West rail station
(extension of existing Schutte street rail station)

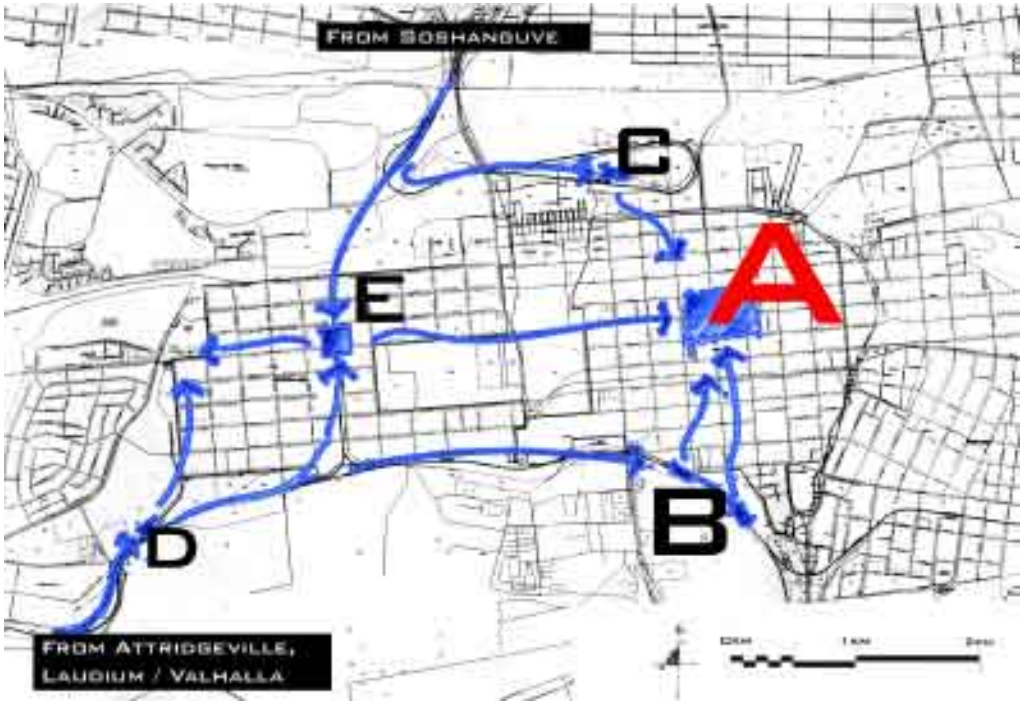

Figure C.2.3
Pretoria inner city links

C.2.5 PRECINCT SPATIAL CONCEPTS

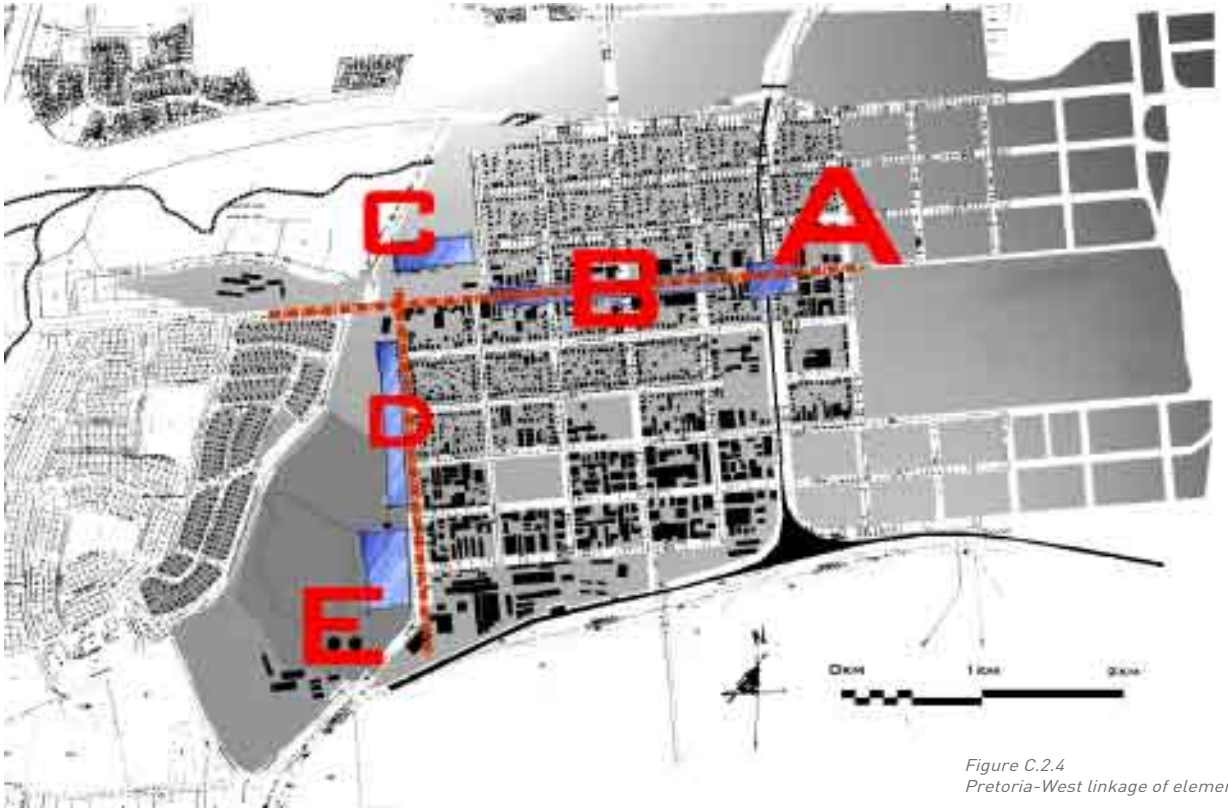

Figure C.2.4
Pretoria-West linkage of elements

A. Conceptual Pretoria West rail station (Creation of preconditions which will promote economic generation through the informal sector).
B. The Church Street "Commercial Strip"
C. Kwagga shopping complex
D. Conceptual Green pedestrian link to Church Street - with proposed residential social structure.
(Creation of preconditions which will promote the use of renewable energy systems and general sustainable methods for residential design)
E. Conceptual Awareness centre

C.2.5 SITE CONCEPT

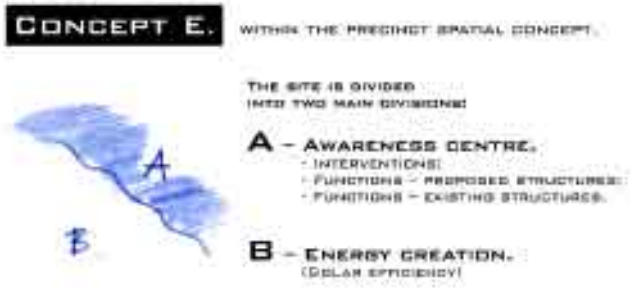

Figure C.2.5
Site divide

[STAGE A.1]

THE AWARENESS CENTRE WITHIN THE CONCEPT, IS APPROACHED THROUGH THREE MAIN CRITERION DIVISIONS:

BIO-DIESEL

Introduction

This information is guided by the 'biodiesel.com' website. As the topic of bio-diesel is of a technical nature, much of the information has been translated directly from the writings within the website, as my understanding of Bio-diesel is guided through this research.

It is important to note that this is a FUTURE CONCEPT

The Fuel

"Bio-diesel is a completely natural, renewable fuel applicable in most any situation where conventional petroleum diesel is used. Even though "diesel" is part of its name, there are no petroleum or other fossil fuels in bio-diesel. Bio-diesel is 100% vegetable oil based.

Bio-diesel as product is currently produced mainly from field crop oils throughout Europe and used widely in a range of diesel vehicles. However, the fuel produced in Hawaii by Pacific Bio-diesel, Inc. is made totally from recycled cooking oil and used mostly in generators of all sizes, commercial diesel equipment, vehicles, and marine vessels. The Maui processing plant has made it more economical for pump trucks to deliver used restaurant oil to Pacific Bio-diesel than to landfill it, resulting in a landfill diversion total of over 40 tons of used cooking oil per month.

In the past decade, bio-diesel has been gaining world-wide popularity as an alternative energy source because of its many benefits. Besides the huge landfill reduction benefits, this environment-friendly fuel reduces tailpipe emissions, visible smoke and noxious odours. It operates well in a conventional diesel engine with very few or no engine modifications, and can also be used in a blend with conventional diesel while still achieving substantial reductions in emissions. Because bio-diesel is non-toxic, biodegradable and non-flammable, handling and storage is safer than conventional petroleum diesel fuel. And, the cost compares well when pricing against other alternative fuels.

Technically, bio-diesel is Vegetable Oil Methyl Ester. It is formed by removing the triglyceride molecule from vegetable oil in the form of glycerine (soap). Once the glycerine is removed from the oil, the remaining mol-

ecules are, to a diesel engine, similar to petroleum diesel fuel."

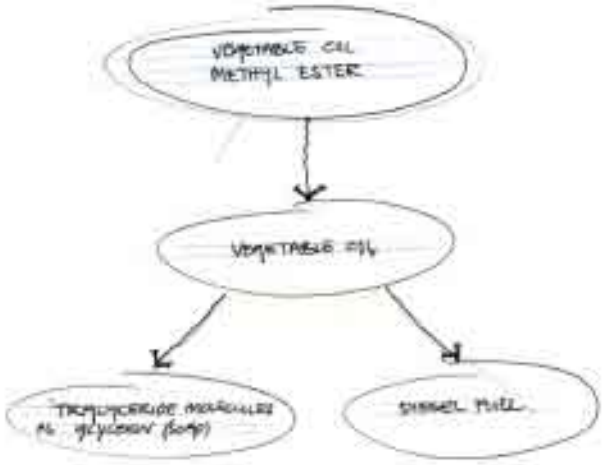

Figure C.2.6
Bio-Diesel process

"There are some notable differences. The bio-diesel molecules are very simple hydrocarbon chains, containing no sulphur, ring molecules or aromatics associated with fossil fuels. Bio-diesel is made up of almost 10% oxygen, making it a naturally "oxygenated" fuel."

www.biodiesel.com/biodiesel_fuel.htm

BIO-DIESEL FACTS

Environmental Impact

Bio-diesel is the only renewable alternative diesel fuel that actually reduces major greenhouse gas components in the atmosphere. The use of bio-diesel will also reduce the following emissions:

- Carbon monoxide
- Ozone-forming-hydrocarbons
- Hazardous diesel particulate
- Acid rain-causing sulphur dioxide
- Lifecycle carbon dioxide

Power

One of the major advantages of bio-diesel is the fact that it can be used in existing engines and fuel injection equipment (no modification required) without negative impacts to operating performance.

Storage

Bio-diesel readily blends and stays blended with petro-diesel so it can be stored and dispensed wherever diesel is stored or sold.

Combustibility/Safety

Bio-diesel has a very high flash point (300°F) making it one of the safest of all alternative fuels.

Production/Refining

Bio-diesel is the only alternative fuel that can boast of a zero total emissions production facility (appendix 007).

Lubricity

Bio-diesel is the only alternative fuel that can actually extend engine life because of its superior lubricating properties.

OIL PRODUCING PLANTS
Corn
Cashew
Oat
Palm
Lupine
Rubber seed
Kenaf
Calendula
Cotton
Hemp
Soybean
Rapeseed
Olive tree
Castor bean
Jojoba
Pecan
Oil Palm

Table C.2.1
Bio-Diesel
oil producing plants

B.POSSIBLE FUTURE SCHEME

The Pretoria West energy supply strategy is that of converting solar energy into part of the energy requirements met by Eskom.

The ideal energy concept would be that of taking the Pretoria West power station, a fossil fuel plant, and converting it into a fully renewable energy plant, through the utilisation of solar energy. The reality of the utilisation of solar energy is that it requires a large area for the placing of solar collectors, area that an urban context does not allow for.

Therefore, the concept utilized will be that of load shifting, in other words, the use of solar energy available on the site and neighbouring sites will assist in the creation of energy by effectively increasing the effiency of coal. (I.e. When solar energy is available (daylight), it will assist in the heating of the water, used to drive the steam turbines, before the water enters the boilers to be fully heated by the coal burning process, resulting in less coal being utilised. This reduction on the coal load reduces the quantities of coal delivered and the associated embodied energy link to that coal.)

Importantly, the existing infrastructure of the Pretoria West power station will be used.

Energy management in South Africa

In 1989 Eskom responded to the South Africa rural communities electricity needs by embarking on a national electrification drive. This drive has the potential to generate over 5 million new residential customers by 2005. Various studies have proven that the load-profile of electricity costumers has the tendency to peak to a regular pattern.

Wilken, A 2001:1

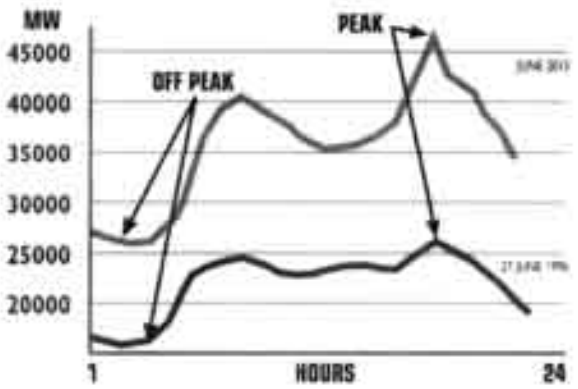

Figure C.2.7

National demand profile - actual values of 1996 compared with estimated simulation profiles for 2015

Morning peak: between 08:00 and 10:00

Evening peak: between 18:00 and 20:00

Wilken, A 2001:1

From the peak energy consumption hours indicated in fig C.2.7, it is clear that this solar concepts will assist in the effiency of coal dramatically in the peak between 18:00 and 20:00 as it will have a full day to have pre-heated the water for the boiler.

THE CHALLENGE O F THIS SCHEME LIES IN THE INTEGRATION OF A & B.