



THE STATE OF ELECTRICITY SUPPLY TO SOUTH AFRICA

**Eskom's Presentation to the Public Enterprises
Portfolio Committee**

14th February 2007

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 - **Maintenance**
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BACKGROUND

OVERVIEW - SUPPLY AND DEMAND

- Eskom's capacity:
 - **As at 1 January 2007 = 36 748 MW (excluding HCB @ 1150 MW)**
 - **As at 1 June 2007 = 38 368 MW (excluding HCB @ 1 450 MW)**
 - *Includes Atlantis and Mossel Bay (1050MM)*
 - *RTS – 1 110 MW of Camden Units*
- Peak Demand:
 - **29 June 2006 = 34 807 MW**
 - **Forecast for 2007 = 36 306 MW**
- Current Reserve Margin
 - **8 to 10%**
 - **Global benchmark of 15%**

DECLINING RESERVE MARGIN

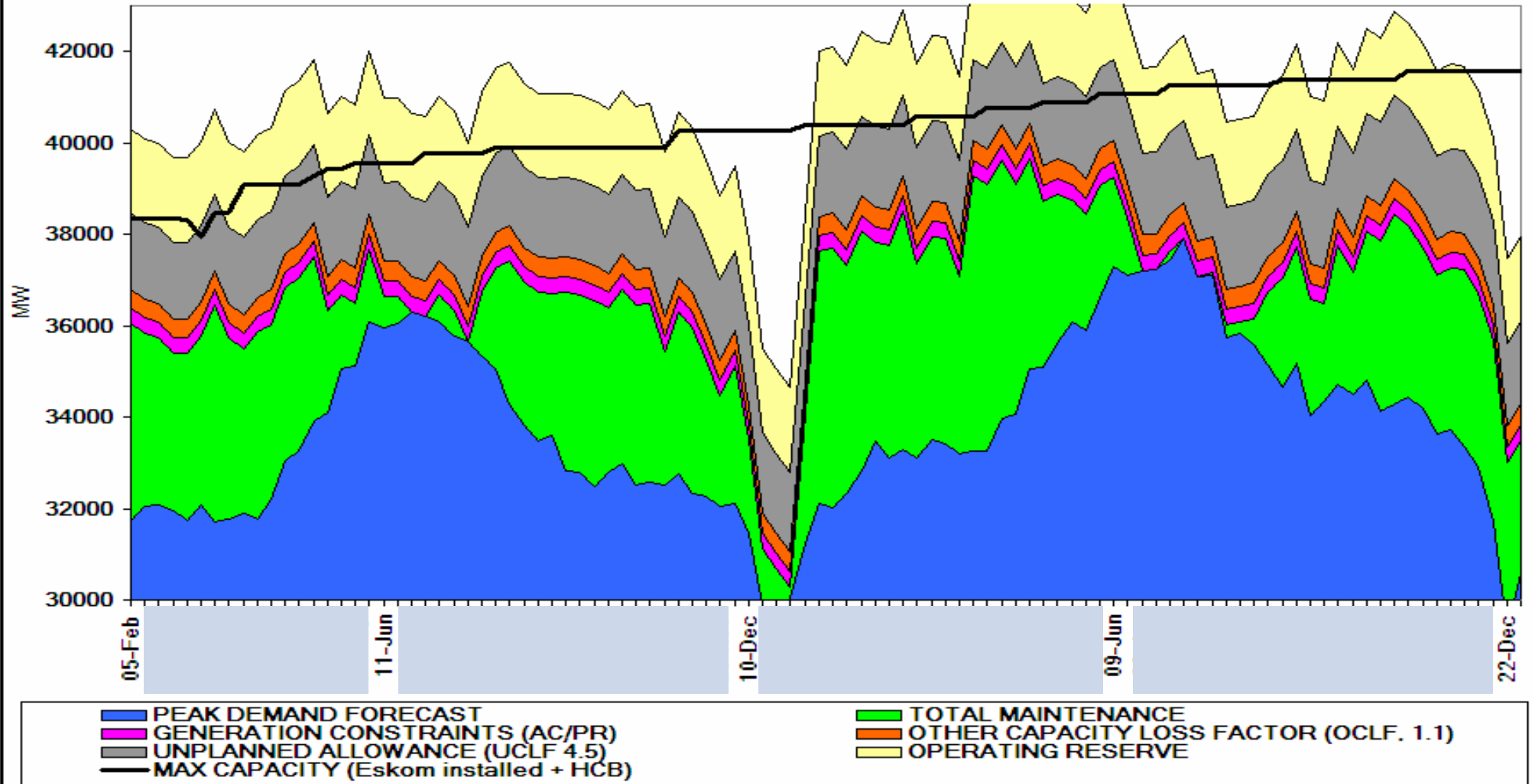
- **Declining reserve margin**
 - 2001 = 25%
 - 2003 = 20%
 - 2005 = 16%
- **Why declining reserve margin:**
 - Started construction of new capacity late.
 - GDP growth in the last 3 years higher than anticipated.
 - Growing customer base

HOW DO WE DO MAINTENANCE ?

- **Outage co-ordination entails optimally using our Generation stations, Transmission planning and System Ops;**
- **Eskom holds an optimisation workshop every year in order to determine the outage program (which includes planned maintenance) for the year;**
- **We look at the weekly load forecast provided by National Control (two years ahead), and ISEP (10 years ahead);**
- **We then look at weekly forecasted demand against the capacity available – this would determine how we allocate where and when maintenance will take place;**
- **Most outages are scheduled during the low demand periods, between January to May and August to December;**
- **Generation outages are not generally scheduled over winter months – because of higher peak requirements and sensitivity to temperature changes**

PLANNED MAINTENANCE

05 FEBRUARY 2007



FORECAST – A VARIABLE IN THE EQUATION

Method used for energy forecasting:

- Note is taken of the change in the structure of the SA economy
- Due to the high level of uncertainty a “cone” approach is used
- Current average annual GDP growth rates used in long term forecasts are
 - **3.0% low growth**
 - **4.2% moderate growth**
 - **5.0% high growth**
 - **6.0% by 2010/2014 (AsgiSA)**

FORECAST – A VARIABLE IN THE EQUATION

Method used for maximum demand forecasting (MW):

- Use an hourly load model
- Inputs to model are
 - **Load profiles for about six economic sectors**
 - **Energy forecasts (previous slides) for each sector**
 - **losses**
- Outputs of model are hourly maximum demand figures for the 20 to 25 years
- These outputs are then fed into the planning model

Summer 2006 Review (Oct '06 to Mar '07)

Date	Week	Forecast	Available Capacity	Less OR and UA	Surplus / Deficit
4-Dec-06	49	31291	34594	31194	-97
11-Dec-06	50	30922	33219	29819	-1103
18-Dec-06	51	30107	33716	30316	209
25-Dec-06	52	27304	34111	30711	3407
1-Jan-07	53	26034	33585	30185	4151
8-Jan-07	1	29368	33775	30375	1007
15-Jan-07	2	30277	32670	29270	-1007
22-Jan-07	3	31010	33035	29635	-1375
29-Jan-07	4	31142	34833	31433	291
5-Feb-07	5	31558	34713	31313	-245
12-Feb-07	6	31645	34778	31378	-267
19-Feb-07	7	31879	34448	31048	-831
26-Feb-07	8	32047	34448	31048	-999
5-Mar-07	9	31920	34522	31122	-798
12-Mar-07	10	32305	34511	31111	-1194
19-Mar-07	11	31758	34671	31271	-487
26-Mar-07	12	31628	34267	30867	-761

Green

- If the Actual Supply (AS) is greater than the Required Supply (RS) and meets the 1900 MW reserve.

Yellow

- If the Actual Supply (AS) is greater than the Required Supply (RS) and the deficit is less than 1000MW.
- Use of Contracted DMP resources to manage demand.

Orange

- If Actual Supply (AS) deficit to Required Supply (RS) is between 1000 MW and 2000 MW.
- Use Interruptible loads and DMP to manage demand.

Red

- If Actual Supply (AS) deficit to Required supply (RS) is between 2000 MW and 3000 MW.
- Use interruptible loads and have some mandatory load shedding.

Brown

- If the Actual Supply (AS) deficit to Required Supply (RS) is more than 3000MW.
- Rotating mandatory load shedding to manage demand



Assumption: Unplanned Allowance – 1 500 MW and Operating Reserve – 1 900MW

Summer 2006 Sensitivity

Date	Week	Available Capacity	Increase in Unplanned Allowance to 2000MW			Higher Confidence Level in Load Forecast		
			Forecast	Less OR & UA	Surplus / Deficit	Forecast	Less OR & UA	Surplus / Deficit
4-Dec-06	49	34594	31291	30694	-597	31391	31194	-197
11-Dec-06	50	33219	30922	29319	-1603	31022	29819	-1203
18-Dec-06	51	33716	30107	29816	-291	30207	30316	109
25-Dec-06	52	34111	27304	30211	2907	27404	30711	3307
1-Jan-07	53	33585	26034	29685	3651	26134	30185	4051
8-Jan-07	1	33775	29368	29875	507	29468	30375	907
15-Jan-07	2	32670	30277	28770	-1507	30594	29270	-1324
22-Jan-07	3	33035	31010	29135	-1875	31202	29635	-1567
29-Jan-07	4	34833	31142	30933	-209	31190	31433	243
5-Feb-07	5	34713	31558	30813	-745	31563	31313	-250
12-Feb-07	6	34778	31645	30878	-767	31665	31378	-287
19-Feb-07	7	34448	31879	30548	-1331	31895	31048	-847
26-Feb-07	8	34448	32047	30548	-1499	32062	31048	-1014
5-Mar-07	9	34522	31920	30622	-1298	31926	31122	-804
12-Mar-07	10	34511	32305	30611	-1694	32315	31111	-1204
19-Mar-07	11	34671	31758	30771	-987	31772	31271	-501
26-Mar-07	12	34267	31628	30367	-1261	31651	30867	-784

Winter 2007 Review (Apr '07 to Sep '07)

Date	Week	Forecast	Available Capacity	Less OR and UA	Surplus / Deficit
2-Apr-07	13	31687	34658	31358	-329
9-Apr-07	14	31674	34843	31543	-131
16-Apr-07	15	32383	34238	30938	-1445
23-Apr-07	16	32388	35163	31863	-525
30-Apr-07	17	33407	35163	31863	-1544
7-May-07	18	33790	35843	32543	-1247
14-May-07	19	34263	36483	33183	-1080
21-May-07	20	34551	37118	33818	-733
28-May-07	21	34588	38027	34727	139
4-Jun-07	22	35193	37804	34504	-689
11-Jun-07	23	35523	38727	35427	-96
18-Jun-07	24	35337	38814	35514	177
25-Jun-07	25	35479	39399	36099	620
2-Jul-07	26	35442	39589	36289	847
9-Jul-07	27	35917	39009	35709	-208
16-Jul-07	28	36017	39009	35709	-308
23-Jul-07	29	35612	39584	36284	672
30-Jul-07	30	35379	38305	35005	-374
6-Aug-07	31	34329	37655	34355	26
13-Aug-07	32	34435	37397	34097	-338
20-Aug-07	33	34248	37397	34097	-151
27-Aug-07	34	33893	37260	33960	67
3-Sep-07	35	33425	36965	33665	240
10-Sep-07	36	33893	35970	32670	-1223
17-Sep-07	37	32976	36165	32865	-111
24-Sep-07	38	33224	35975	32675	-549

Winter 2007 Sensitivity

Date	Week	Available Capacity	Increase in Unplanned Allowance to 2000MW			Higher Confidence Level in Load Forecast		
			Forecast	Less OR and UA	Surplus / Deficit	Forecast	Less OR and UA	Surplus / Deficit
2-Apr-07	13	34658	31687	30858	-829	31682	31358	-324
9-Apr-07	14	34843	31674	31043	-631	31721	31543	-178
16-Apr-07	15	34238	32383	30438	-1945	32407	30938	-1469
23-Apr-07	16	35163	32388	31363	-1025	32438	31863	-575
30-Apr-07	17	35163	33407	31363	-2044	33435	31863	-1572
7-May-07	18	35843	33790	32043	-1747	33998	32543	-1455
14-May-07	19	36483	34263	32683	-1580	34447	33183	-1264
21-May-07	20	37118	34551	33318	-1233	34808	33818	-990
28-May-07	21	38027	34588	34227	-361	34722	34727	5
4-Jun-07	22	37804	35193	34004	-1189	35216	34504	-712
11-Jun-07	23	38727	35523	34927	-596	35551	35427	-124
18-Jun-07	24	38814	35337	35014	-323	35351	35514	163
25-Jun-07	25	39399	35479	35599	120	35485	36099	614
2-Jul-07	26	39589	35442	35789	347	35539	36289	750
9-Jul-07	27	39009	35917	35209	-708	35912	35709	-203
16-Jul-07	28	39009	36017	35209	-808	36034	35709	-325
23-Jul-07	29	39584	35612	35784	172	35668	36284	616
30-Jul-07	30	38305	35379	34505	-874	35453	35005	-448
6-Aug-07	31	37655	34329	33855	-474	34345	34355	10
13-Aug-07	32	37397	34435	33597	-838	34431	34097	-334
20-Aug-07	33	37397	34248	33597	-651	34241	34097	-144
27-Aug-07	34	37260	33893	33460	-433	33952	33960	8
3-Sep-07	35	36965	33425	33165	-260	33404	33665	261
10-Sep-07	36	35970	33893	32170	-1723	33884	32670	-1214
17-Sep-07	37	36165	32976	32365	-611	32992	32865	-127
24-Sep-07	38	35975	33224	32175	-1049	33262	32675	-587

Incidents of the Week of 15th January 2007

Incidents of the Week of 15th January 2007

15 Jan 2007
4934 MW of Plant on Planned Maintenance

This plant had been out on maintenance since the first week of January 2007 and could not be brought back earlier.



15 Jan 2007
Unplanned Outages at Camden & Matimba
Total - 975 MW lost

- Supplemental DMP resources used
- Emergency Level 1 declared



17 Jan 2007
Additional Unplanned Outages at Camden, Matimba, Majuba, Kriel & Tutuka
Total - 2704 MW lost

Most contracted interruptible load customers had been used on 16th and 17th January



18 Jan 2007
Eskom convenes Emergency Response Command Centre at 04h00



18 Jan 2007
Reduction of 575MW at Matimba, Arnot and Tutuka
Total - 4904 MW

Total of 4904 MW not available on an unplanned basis.



18 Jan 2007
Additional Unplanned Outages at Koeberg, Matimba and Hendrina
Total - 4329 MW lost

Key reasons for forced outages

- Boiler tube leaks
- Air heater repairs
- Turbine trip



18 Jan 2007
Load shedding commenced at 08h00.
Estimated that 2800MW shed. Process of verification to determine actual MWs lost still in progress.



18 Jan 2007
Load restoration process commence at 11h09



18 Jan 2007
Bulk supplies resumed at 16h40

KEY LESSONS LEARNT

Focus	Key Lessons	Actions
Emergency Warning	It has been acknowledged that we could perhaps have alerted the country to the potential problems earlier than we did.	Emergency Response to include an Alert Protocol to communicate to customers.
Emergency Response	Not all Regional Joint Command Centres convened.	Role of RJCCs and ERCC to be clarified.
Load Shedding	Provide clear and prompt view of load shedding schedules	Distribution has published the Load Shedding schedules on the website.
Communication Effectiveness	<ul style="list-style-type: none"> • Improve communication with stakeholders in an emergency 	Review and enhance Emergency Communication Procedures

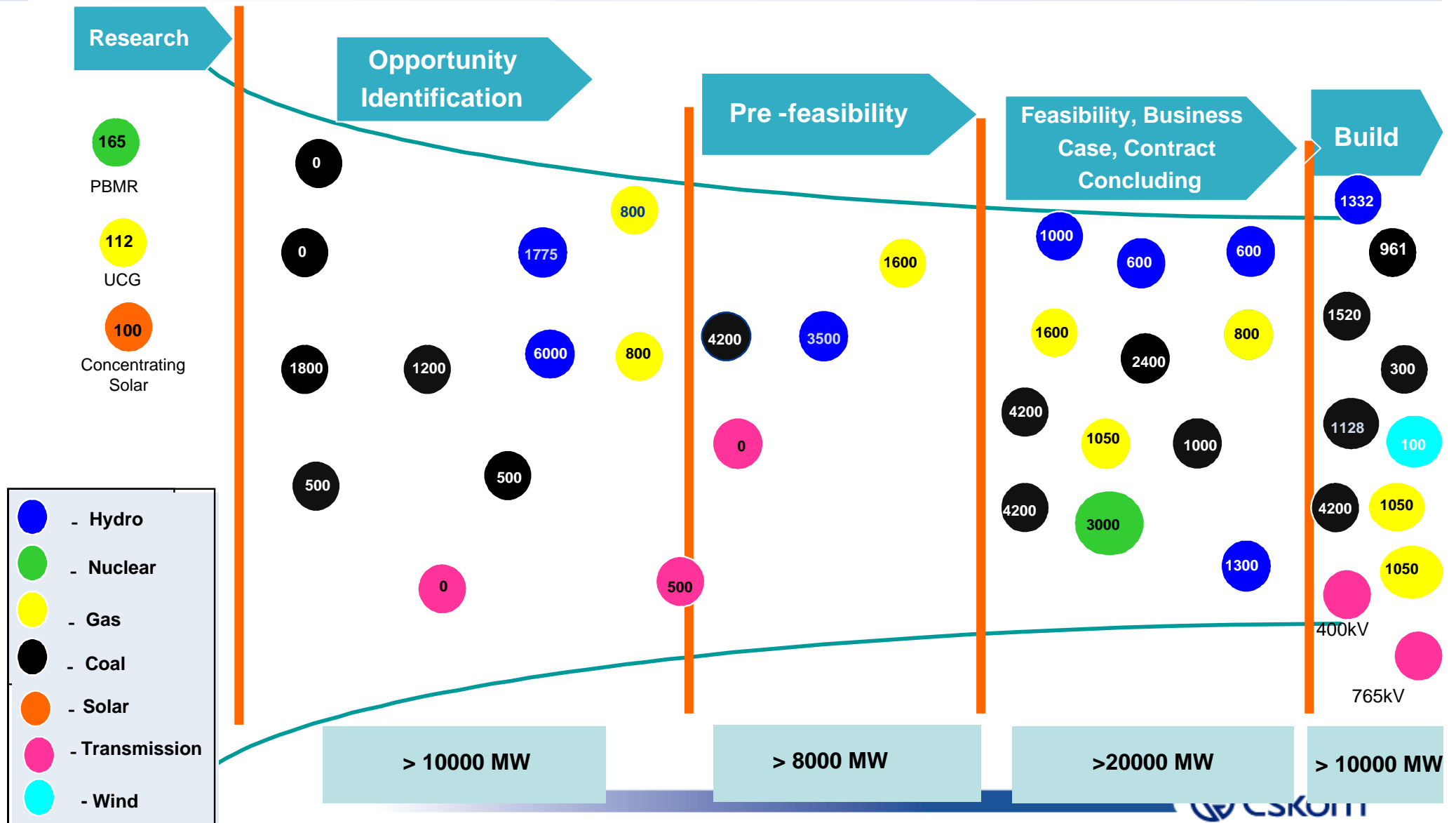
KEY POWER SYSTEM RISKS

- Extended outage of a large coal fired thermal unit or of a nuclear unit (600 to 900 MW).
- Outages of one or two lines in major transmission corridors.
- Premature failures of large generation and transmission transformers
- Aging of plant
 - Control and Instrumentation systems failure due to aging;
 - turbine component failure due to aging
- Risk of not meeting environmental requirements leading to plant shutdown
- Dramatic reduction in coal stockpiles resulting in units having to shut down.
- Unavailability of liquid fuel for open cycle gas turbines.











Eskom is mobilising mitigation actions to manage these risks more effectively.

Capacity Expansion: Progress to date

Capacity Project Funnel



UPDATE ON CAPACITY EXPANSION MAJOR PROJECTS

1. Camden		Units 6, 7, 8 & 5 in commercial operation (CO). Unit 4 CO accelerated to end Feb 07. Will miss the accelerated target date and will go CO end March.
2. Grootvlei		Unit 1 commercial operation planned for Sep 07. Target date accelerated to May 2007
3. Komati		Unit 9 planned date for Sept 2008. Target date accelerated to Sept 2007.
4. OCGT		Very tight schedule. Good progress to date. Atlantis and Mossel Bay will be ready to supply winter of 2007.
5. Braamhoek		Progressing well. On schedule
6. Alpha		Very tight schedule. 48 months construction period. Delays in finalising the RoD for the EIA will delay delivery date of project.
7. Gas 1		RoD for the EIA might delay the delivery date of the project.
8. Beta/Delphi		Behind schedule due to inclement weather and servitude issues. June 2007 completion date under threat.
9. Platinum Basin		Land acquisition and servitude issues still outstanding on a small portion of the Apollo/Dinaledi 400 kV line - 10km outstanding before project completed.
10. 765 kV to Cape		Need to finalise servitude issues before contract placement. Slow progress in RoD.

Demand Side Management (DSM)

DSM AS A KEY RESPONSE PLAN

- **Demand Side Management (DSM) will be critical in mitigating the tight reserve margin in the next few years.**
- **National awareness of DSM will be increased in the upcoming months.**
- **The target for DSM is an average savings of 500 MW per year for the next six years.**
- **Eskom's plans are to accelerate the evaluation and implementation of the DSM programme to achieve this target.**
- **DSM is to be implemented as a core business activity that is key to managing the tight margins in the next 4-5 years.**

WHAT THE PUBLIC CAN DO?

- **Use electricity sparingly. Media campaigns give savings tips such as:**
 - Switch off lights in rooms not occupied
 - Geyser temperature to 55 degrees
 - Save hot water e.g. Shower rather than bath
 - Pool pumps to 6 hours per day or less
- **Watch out for Power Alert on SABC TV and cut back usage for a few hours on non-essential appliances when system under pressure including:**
 - Dishwashers
 - Washing machines
 - Tumble Dryers
- **Become informed buyers for appliances and equipment purchased – insist on energy efficient appliances and equipment**
- **Retrofit your home and business premises with energy savings devices such as efficient lights and ceiling insulation**

ROLE OF LEADERSHIP

- **Set the example on being energy efficient – government buildings and parliamentarian’s residences**
- **Convey the savings message to constituency**
- **Support energy efficiency policy measures to be proposed within next year, possibly including:**
 - Energy efficient building design
 - Incentives for energy efficient appliances
 - Dis-incentives on the importation and use of inefficient appliances
 - The use of alternative energy to electricity for residential space heating and cooking

ROLE OF ESKOM

- **Champion an accelerated DSM through:**
 - Large scale energy efficiency programme countrywide focusing on
 - Household
 - Industry
 - Commerce
- **Increased expenditure on energy efficiency upgrades**
- **National Power Alert on SABC**
- **Billion kWh campaign**
 - Eskom internal energy efficiency drive
 - Targeting employee and Eskom own installation.

CONCLUSION

Conclusion

- A comprehensive plan is being looked at to address the way forward.
- In addition to Operation Thekgo and DSM, there are plans to manage the Electricity Supply situation on a national scale that includes key stakeholders.
- Key learning from the incident:-
 - Communication effectiveness and load shedding processes will be improved to share with consumers earlier warnings of an outage of this nature.
 - Teams have been mobilised within the business to hardwire these lessons immediately.
- Eskom will be appealing to customers and the public to collectively reduce national electricity consumption to limit the occurrence of power disruptions.