

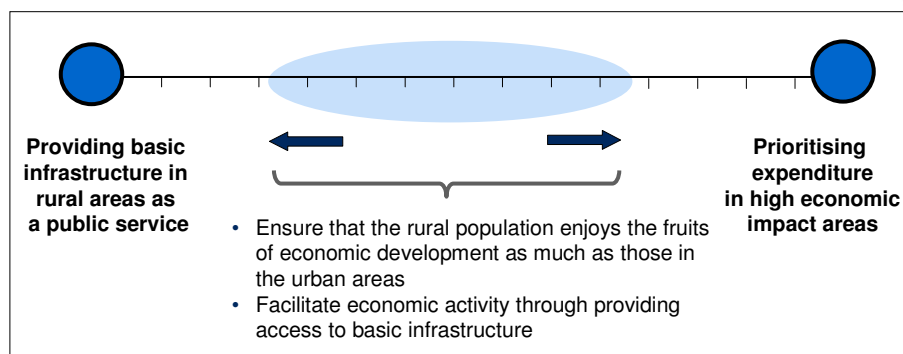
# PEMANDU Lab Highlights: Rural Basic Infrastructure

*“We aim to ensure Malaysians living in rural areas are connected to the roads network, and have access to housing, electricity and clean water. This requires us to manage the polarity between investing in rural and urban areas. The targets we have set ourselves are very ambitious as we attempt to build 11 times as many kilometres of roads, 2.5 times as many houses, provide 5 times as many houses with electricity, and connect 7 times as many houses to clean water over the next 3 years, as compared to what we had achieved in the 2006-08 timeframe. I am accountable and committed to achieving these targets by the end of 2012 and seek your support in working with me and my team to deliver these results.”*

(Dato' Seri Haji Mohd Shafie bin Haji Apdal, Minister of Rural and Regional Development)



### Managing polarities: Rural basic infrastructure



Improving the provision of basic infrastructure for the rakyat living in rural areas is another of the Government's priorities. Access to basic infrastructure is a fundamental right of all Malaysians. Water, electricity, road and housing infrastructure are important for the population's health, their socio-cultural advancement and are part of the essential foundations of the Nation's economy.

Around 35% of Malaysians live in rural areas (rising to nearly 70% in some states). Currently this large segment of the population benefits least from the economic progress we have enjoyed over the past decades as a nation. Developmental spend is disproportionately skewed towards urban development, and the mix of rural development allocation has dropped markedly from a high of 25% in the 6<sup>th</sup> Malaysia Plan, to 12.4% in the 8<sup>th</sup> Malaysia Plan.

Ensuring access to basic infrastructure in rural areas ensures more equitable distribution of wealth, facilitates economic activity (e.g., road connectivity facilitates increased trade and commerce as it allows freer movement of goods and services, whilst the availability of electricity and water is essential for many types of industrial activity), and has a direct effect on national GDP (a widely-cited economic index puts the direct multiplier effect of infrastructure GDP spending at 1.5 times the expenditure<sup>1</sup>).

Malaysia has progressed significantly in the provision of rural basic infrastructure. For instance, *in each year* from 2006 to 2008,

<sup>1</sup> *A Second Quick Boost From Government Could Spark Recovery*: comments by Mark Zandi, chief economist of Moody's Economy.com. Edited excerpts of testimony he gave before the U.S. House Committee on Small Business on July 24, 2008

- ~220 kilometres of roads were built or upgraded
- ~10,000 households benefitted from electrification
- ~18,000 homes were given access to clean or treated water
- ~7,000 houses were built or restored in rural areas to benefit the poor

In spite of Malaysia's very considerable achievements in these areas, more needs to be done to serve the rural population. There are many villages still not connected by roads, especially in East Malaysia. More than a quarter of households don't have access to electricity in East Malaysia. And upwards of 40% of households in East Malaysia and 12% of households in Peninsular Malaysia lack access to clean or treated water.

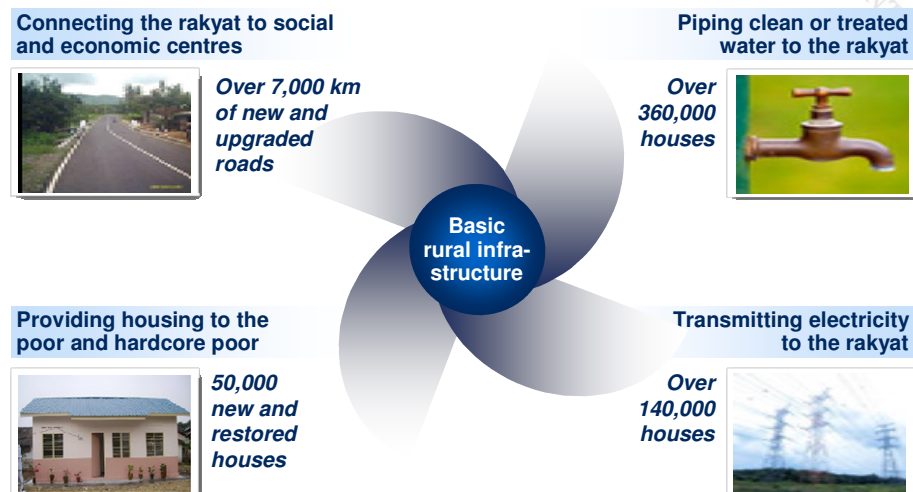
Consequently, the Government has embarked on a major rural basic infrastructure development programme, centred on improving the quality and pace of the provision of roads, water, electricity and housing to the rural population.

**The breadth, scale and pace of the programme will need to be 2.5-10x greater than what has gone before**

The breadth, scale and pace of aspiration in increasing rural access to basic infrastructure is significant. As summarized in Figure 1, the aspiration is to deploy more than 7,000 km of new and upgraded roads, provide 50,000 new and restored houses to the poor, ensure access to clean or treated water to over 360,000 households, and provide access to electricity to over 140,000 households.

Figure 1

### Malaysia is embarking on a major programme of rural basic infrastructure development

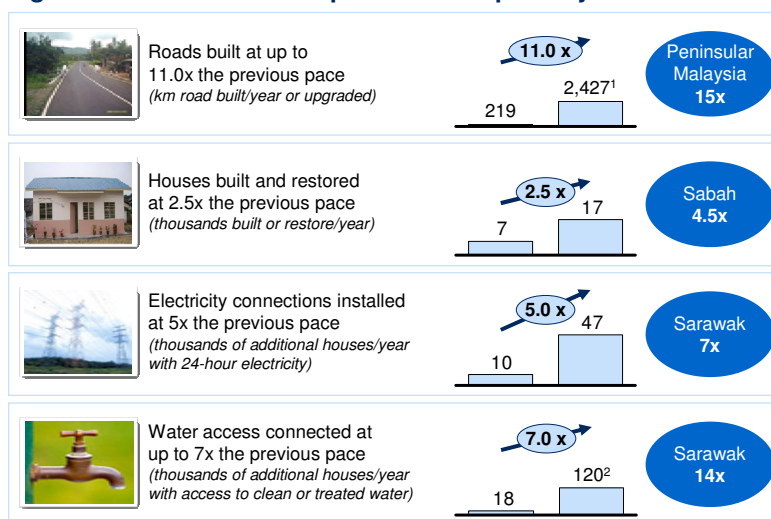


The implication of this aspiration is that the pace of deployment of these basic services will need to be significantly greater than what has been achieved over the past years. Comparing the pace of delivery in the 3-year period between 2006-2008 vs. what will be required for the upcoming 3-year period between 2010-2012 (see Figure 2):

- Roads: **~11x** as many kilometres of roads will be built or upgraded
- Housing: **~2.5x** as many houses will be built or upgraded
- Electricity: **~5x** as many houses will be connected
- Water: **~7x** as many houses will be connected to clean or treated water

Figure 2

**The scale and pace of delivery to reach announced targets will be much greater than executed in previous completed years**



1 Achieving 100% population living within 5km of paved road  
 2 Based on achieving the 98% for Peninsular, 90% target for Sarawak and Sabah  
 SOURCE: KKLW; JKR

Average completed 2006-08  
 Average completed 2010-12

## The programme will have huge impact on the rakyat

The Government will commit significant investment to improve rural basic infrastructure. Initial cost estimates suggest that up to RM 18 billion will need to be spent over the next 3 years to achieve the desired outcomes.

## The Government will oversee a building programme to build or upgrade approximately 7000 kilometres of Federal and State roads

As part of this programme, approximately 1,900 km of roads will be built in East Malaysia, ~70% of which will be paved roads (the remainder being gravel roads). As a result of the programme, an estimated 800,000 people will be connected to the roads network.

In Peninsular Malaysia, where nearly the entirety of the population already is connected to the roads system, the focus will be on upgrading rural roads to paved roads. When this programme is concluded, close to 100% of the population in Peninsular Malaysia will live within 5 kilometres of a paved road.

The roads to be built and upgraded across the country in the NKRA programme have been identified on a road-by-road basis (point of origin and destination, total length, width, material to be used, implementing agencies, people connected) to

ensure that all implementation considerations and challenges are taken into account, and to optimize for on-time and in-budget delivery. An excerpt of the planning data for the roads programme is shown below (Figure 3).

**Figure 3**

**A comprehensive roads project database was created**



EXAMPLE

TAMBAHAN 2010, 2011, 2012, 2013, 2014														
JALAN														
REPERUTASI														
PROJEK	KESEKUTUPAN	KESEKUTUPAN	NAMA PROJEK	PAKALAN	DUN	DAERAH	PANJANG (km)	LEBAR (meter)	JENIS	SKALA (RM)	RIS PER KM (RM)	2010 (RM)	2011 (RM)	2012 (RM)
JAL1	SARAWAK	JAL1 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL2	SARAWAK	JAL2 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL3	SARAWAK	JAL3 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL4	SARAWAK	JAL4 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL5	SARAWAK	JAL5 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL6	SARAWAK	JAL6 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL7	SARAWAK	JAL7 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL8	SARAWAK	JAL8 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL9	SARAWAK	JAL9 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300
JAL10	SARAWAK	JAL10 SARAWAK	Jalan Rangkaian Bersejarah, Sg. Tem, Tem	BERSEKUTUPAN	BERSEKUTUPAN	BERSEKUTUPAN	3.0	5	BERSEKUTUPAN	5,200,000.00	1,733,333	5,200,000	3	300

More than ~6,00 line items in the roads databases

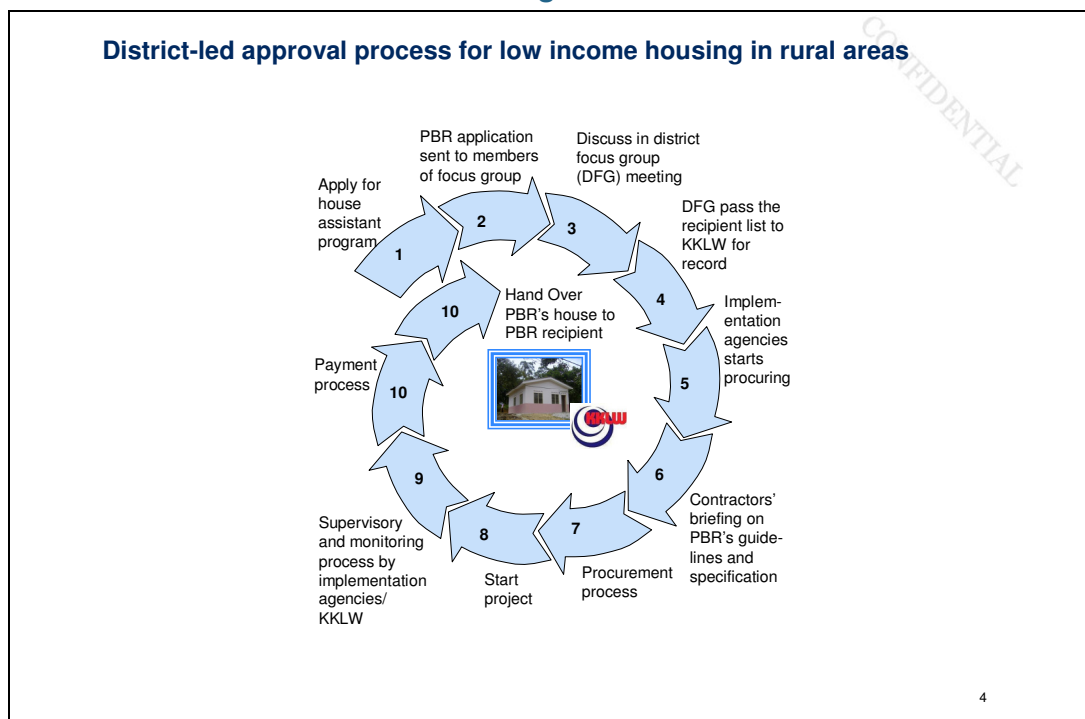
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## 50,000 houses will be built for the rural poor and hardcore poor

Approximately two thirds of the 50,000 houses are to be built in East-Malaysia, with the balance to be built in Peninsular Malaysia.

Beyond the funding and deployment challenge of building and upgrading 50,000 homes, a key issue to be resolved is ensuring beneficiaries are truly deserving of these houses. Potential beneficiaries of the housing programme are identified from District and State level agencies and Civil Servants as well as from the e-Kasih portal, the national database on low income households. A District level focus group assesses the merit of potential beneficiaries and reaches a decision on inclusion or not in the housing program. Beneficiary selection at the District level ensures local realities on the ground are taken into account in the selection process. Figure 4 outlines the process used to identify and select beneficiaries for the housing programme.

Figure 4



To ensure delivery of houses to a consistent quality standard, the houses built in this programme will be of a standard design. In addition to ensuring consistency of delivery quality, using a standard design allows for better control of the costs associated with this programme: the standard design is broken down to the component materials (steel beams, plywood, plaster, sand, ready-mix, etc.) and standard labour amounts, and thus the expected cost of delivery can be planned for and managed to.

The housing program is designed to be executed by Class F contractors, small entrepreneurs in the contracting and construction business across the country. Designing the program in this way ensures maximum participation of rural businesses at the grass roots level in the economic stimulus provided by the housing program.

To ensure that Government funds are being spent in the most efficient manner, the cost of the housing program has been benchmarked against international best practices of low-cost house building for low income households. Malaysia's program of standard designs executed by local contractors compares favourably in such an international benchmark.

Targets have been cascaded down the the state level, taking into account local delivery realities and constraints. The over-arching objective is to ensure houses are delivered within budget and on time.



### 140,000 additional houses will be connected to 24-hour electricity supply

Peninsular Malaysia already has a high degree of electrification today (approximately 99%). East Malaysia, in contrast, has lower rates of electrification (77% in Sabah and 67% in Sarawak). The rural electrification program will connect 140,000 additional homes in 2010 – the majority of which (95%) will be in East Malaysia.

Connecting to grid-based electricity is the default option for adding connections across the country (83% of new connections). These new connections will build upon the investments made in recent years to increase electricity generation capacity in different parts of the country.

Some rural areas, however, are distant from the electricity generation and transmission infrastructure. In these cases, after thorough cost benefit analysis, the decision was made to use distributed power generation technologies such as solar hybrid power generation or micro hydro-electricity to provide access to electricity. These solutions will be applied in approximately 17% of the new connections between 2010-12. Figure 5 includes a visual representation of a solar hybrid power generation solution in Kampung Pak Kaleh, P. Pemanggil

**Figure 5**

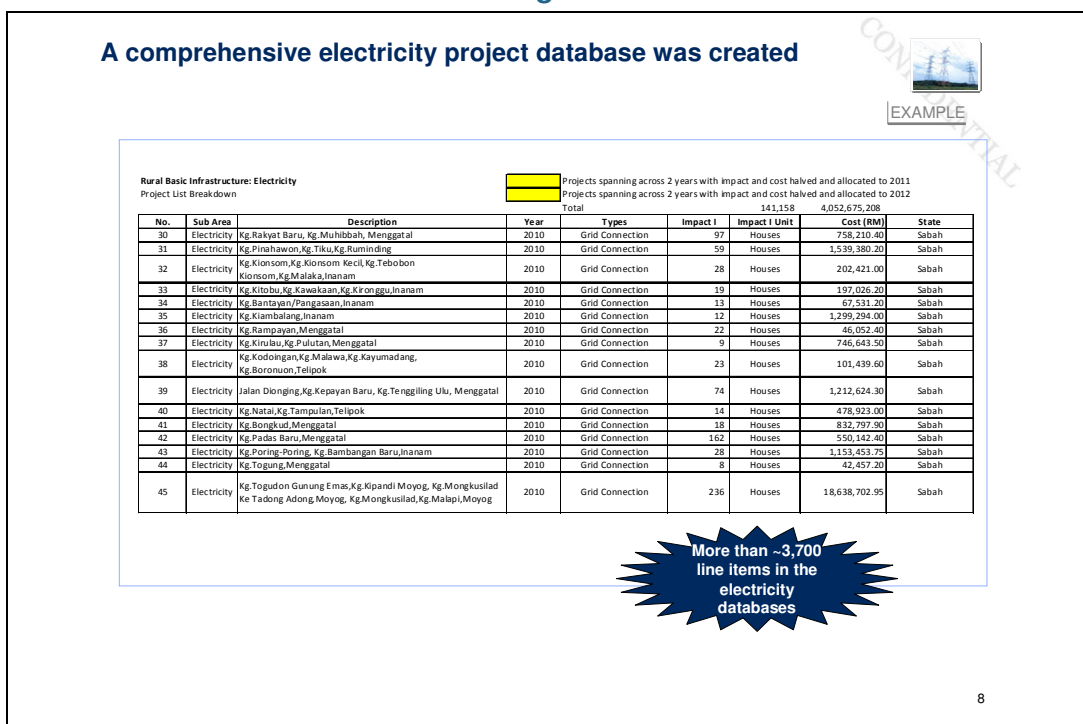
**Solar Hybrid Station at Kampung Pak Kaleh, P. Pemanggil**





Houses to be connected to electricity have been identified on a kampong by kampong basis to ensure that all considerations be made with regard to the ability to deliver the desired outcome to the rakyat within budget and on time. An excerpt of the planning data for the electricity programme is shown below (Figure 6).

Figure 6



### 360,000 additional houses will be connected to clean or treated water

The percentage of houses connected to clean or treated water currently varies from approximately 88% in Peninsular Malaysia to 57% in Sarawak and Sabah. To reach NKRA aspirations, an additional 360,000 houses will need to be connected to clean or treated water between 2010 and 2012.

Connecting to the reticulation network is the default option for adding connections across the country (95% of new connections). While some new connections will build upon the investments made in recent years to increase water treatment capacity in different parts of the country, others will require new water treatment plants (36 water treatment plant projects will need to be completed to serve rural areas across Malaysia)

Some rural areas, however, are more distant from existing water treatment plants and water distribution trunk lines, or are in areas with very low population density. In these cases, after thorough cost benefit analysis, the decision was made to use alternative solutions such as tube wells, gravity wells, or rain water recovery. These solutions will be applied in approximately 5% of the new

connections between 2010-12. Figure 7 includes a visual representation of a rainwater filtration solution in Kampung Stass, Bau, Sarawak.

**Figure 7**

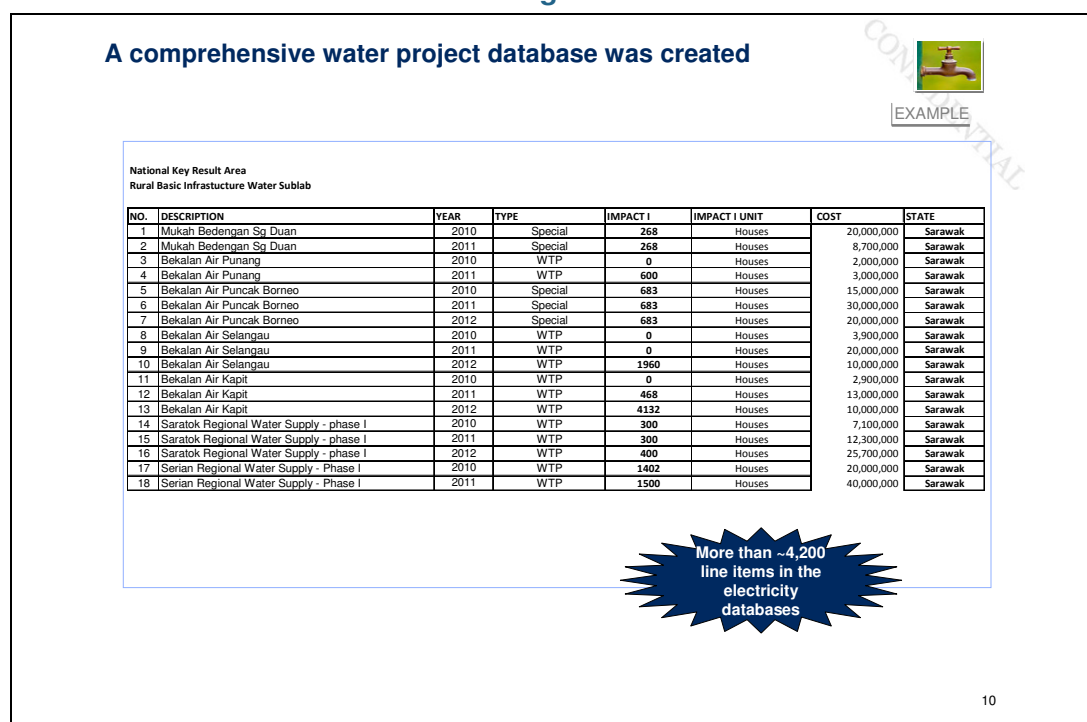
**Alternative water solutions in Kampung Stass, Bau, Sarawak**



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Houses to be connected to clean or treated water have been identified on a kampong by kampong basis to ensure that all practical considerations be made with regard to the ability to deliver the desired outcome to the rakyat within budget and on time. An excerpt of the planning data for the electricity programme is shown below (Figure 8).

Figure 8



## The Government will ensure that enablers are in place to ensure success

As the Government's plans are ambitious, it will put in place measures to enable it to coordinate, monitor and implement the plans successfully. Constraints fall into 3 categories – (a) optimizing the time required to build and upgrade roads and houses, and to connect houses to electricity and water, (b) ensuring a sufficiency of resources (manpower, materials, machines – the 3M's), and (c) putting in place a program management and governance structure to ensure close monitoring and coordination across the 4 areas, and across the country.

## Reducing the time needed for administrative processes

The Government will revamp existing processes to become more efficient. The reality is that with current turnaround times, doing things “the old way” will mean that it is physically impossible to deploy the required infrastructure within 3 years. For example:

- The current roads open tender process consumes 4-5 months from initial advertisement to delivery of award. This processing time will be halved by using more standard templates, parallel processing where possible, accelerating communication between parties (e.g., through use of email), and scheduling a weekly tender board.

- While there is significant variance, land acquisition consumes on average between 8-11 months (from submission of initial plan to payment of compensation and handing over of site). This time will be reduced to between 6-8 months through similar actions and levers

The Government will assure that these time reductions will be based on productivity improvements and 'lean' processes, and that good governance will not be sacrificed to meet the need for faster process times.

Similar to the examples above, process improvements have been identified to reduce the contractor tendering process times for roads, electricity and water by 40-50%.

**Side bar / box: Case example: Reducing the tendering process time for water project contractors from 12-15 months to less than 8 months to be able to deliver new projects in 2010**

**Challenge:** The current tender processes can take between 12-15 months to complete. As a result projects initiated in 2010 cannot even be started within the year.

**Solution:** Tender processes have been reviewed in depth to identify potential efficiency improvements. As a result of this review work, time savings of up to 50% were identified and are being implemented in the government. Certain new 2010 projects will actually see water flowing within the year. Specific actions and interventions that will be made to the water contractor tender processes include:

- Using standard templates and formats where possible
- Allowing only soft copy (CD) with read-only format tender documents
- KKLW Technical Department leading the inspection for tender documents
- Appointing tender evaluation committee early
- Pre-setting the Tender Board meeting schedule

### Increasing the supply of manpower, materials and machines (3Ms) that are critical to delivering the rural basic infrastructure programmes

The Government will ensure that the '3Ms' are adequate. This means facilitating the supply and availability of enough Machinery (e.g., excavators, compactors), Material (e.g., electricity cabling, pre-mix) and Manpower (e.g., contractors, consultants).

The supply of low voltage cable (90-120 millimetre) across Malaysia is a case in point: 79,000 km of this cable is produced annually by 15 domestic producers. The incremental demand from the NKRA electrification program represents 18% of this domestic supply. The Government is working with these suppliers to ensure that production capacity is increased in line with the increased demand to avoid scarcity and price increases. If need be, the Government will additionally facilitate importation with the same objectives.

Another example is the supply of feeder pillar protection equipment: 36,000 pieces of this equipment are produced annually by 10 domestic producers. The incremental demand from the NKRA electrification program represents 38% of this domestic supply. However, discussions with these producers reveal more than 50% spare production capacity is available. The Government is working to ensure that this spare production capacity will be ready to be used when the demand increases.

Similar assessments have been done across key categories for manpower (e.g., different classes of contractors, consultants, etc.), material, and equipment, for the different regions (Peninsular Malaysia, Sabah and Sarawak), for roads, houses, electricity and water. Where shortages are expected (e.g., for gensets in Sabah and Sarawak, welding sets in Sabah, and consultants for water-related projects in Sabah), the Government is working directly with suppliers to ensure a sufficiency of supply when required, and exploring import options where real constraints exist.

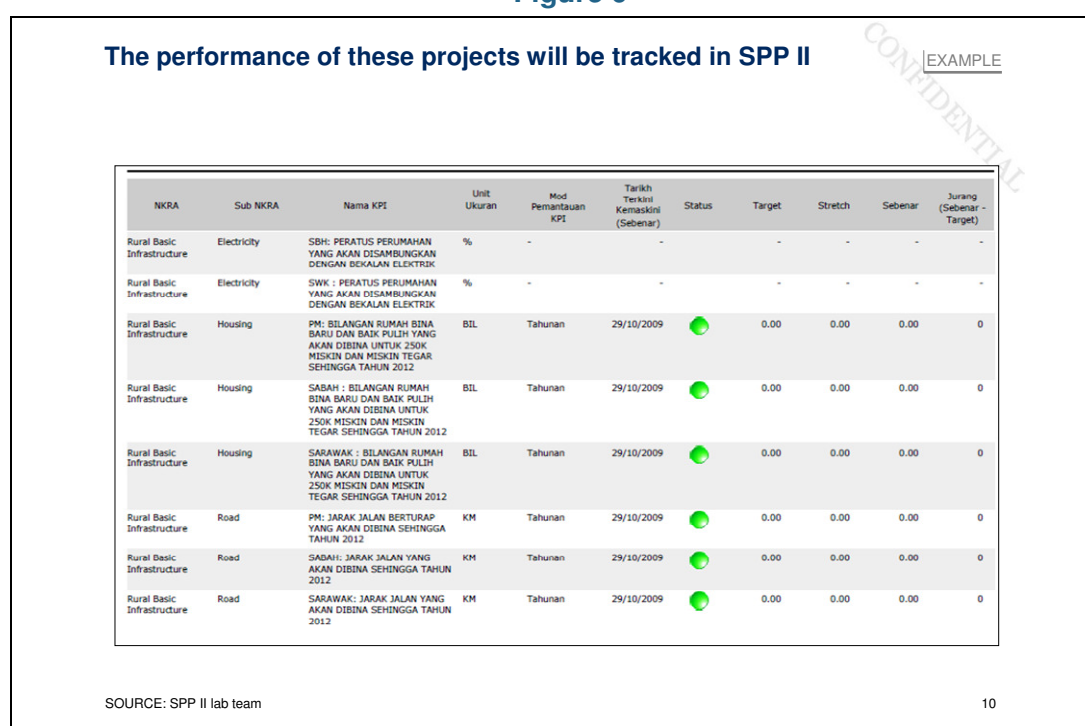
### Ensuring effective program management and a governance structure to monitor and coordinate across programmes

The Government will monitor the projects at a micro level to ensure they are on track. The SPP II system will be used for this. SPP II is a well-established system managed by the Implementation Coordination Unit (ICU) under the Prime Minister's Department.

Rural basic infrastructure projects are recorded in the SPP II system with the desired delivery outcome and the name of a person accountable for ensuring that the project is delivered on time and within budget.

The purpose-built governance mechanisms for the rural basic infrastructure NKRA programmes (led by the Ministry of Rural and Regional Affairs) will use the information drawn from SPP II to monitor progress and intervene where needed (Figure 9 shows a screenshot from the SPP II tool). As described earlier, the Government will go down to the 3-foot level to ensure on-budget and on-time implementation (e.g., monitoring the exact roads and housing units to be built).

Figure 9



### The Government commits to the rakyat on the following rural basic infrastructure outcomes

Focus area	KPI	Current	2010
Roads	• % of population living within 5 km of paved road (Peninsular Malaysia)	• 91%	• 91.4%
	• 1,500 km roads built and upgraded (Sabah &	• Absolute target	• 338

Focus area	KPI	Current	2010
	Sarawak)		
<b>Housing</b>	<ul style="list-style-type: none"> <li># of hardcore poor and poor moved into new or restored house</li> </ul>	<ul style="list-style-type: none"> <li>Absolute target</li> </ul>	<ul style="list-style-type: none"> <li>16,700</li> </ul>
<b>Electricity</b>	<ul style="list-style-type: none"> <li>% of rural houses with access to electricity</li> </ul>	<ul style="list-style-type: none"> <li>Peninsular Malaysia: 99.5%</li> </ul>	<ul style="list-style-type: none"> <li>99.6%</li> </ul>
		<ul style="list-style-type: none"> <li>Sarawak: 87%</li> </ul>	<ul style="list-style-type: none"> <li>73%</li> </ul>
		<ul style="list-style-type: none"> <li>Sabah: 82%</li> </ul>	<ul style="list-style-type: none"> <li>81%</li> </ul>
<b>Water</b>	<ul style="list-style-type: none"> <li>% of rural houses with access to clean or treated water</li> </ul>	<ul style="list-style-type: none"> <li>Peninsular Malaysia: 88%</li> </ul>	<ul style="list-style-type: none"> <li>92%</li> </ul>
		<ul style="list-style-type: none"> <li>Sarawak: 57%</li> </ul>	<ul style="list-style-type: none"> <li>62%</li> </ul>
		<ul style="list-style-type: none"> <li>Sabah: 57%</li> </ul>	<ul style="list-style-type: none"> <li>59%</li> </ul>

## Early signs of progress seen on rural basic infrastructure

The delivery challenge in rural basic infrastructure is significant; driven by the sheer scale and spread of the effort. There are signs however, that the Government's capacity to deliver is already ramping up. For instance:

- The numbers of houses built for the rural poor and hardcore poor will be more than 17,000 in 2009
- In 2009, more than 240 km of roads will be built in East Malaysia

The agencies in charge of delivering these infrastructure programmes have not waited for the start of 2010 to launch their efforts; detailed implementation plans were drawn up in 2009 to ensure that no lead time was lost to up front planning for these massive undertakings.

## Going forward, the Government will intensify efforts to reduce the cost of infrastructure delivery

Even as the Government makes progress along the 4 focus areas, it is already making plans to implement more complex initiatives in the next phase, e.g., **delivering more for less: reducing the cost of infrastructure delivery**. The Government is continuously looking to increase the impact of funds spent on its infrastructure programmes. Within this remit, various ministries and agencies are collaborating to examine whether existing and new technologies can be applied to reduce the average cost of providing basic infrastructure to the rakyat. In this fashion the impact per Ringgit spent can be amplified even further than already is



the case today. Delivery plans will be updated if relevant alternative solutions are identified and proven.