

- There should be Minister of EMS Regulation on implementation of PLTS for high-income people as mandatory.
- There should be Minister of EMS Regulation on Feed-in Tariff PLTS.
- There should be Minister of Finance Regulation on tax reduction, investment subsidy, and cost reduction.
- There should be national standards on PV and national PLTS system.
- There should be institution that is responsible for system labelling of national PLTS.
- There should be program on R & D on PV and PLTS to improve national capacity of that area.
- There is a need to improve a capacity of negotiation for solving the IPR barrier.
- There is a need to socialize this technology to communities.

### **RBCS Technology**

- There should be Minister of Finance Regulation on incentive of interest rate and discount rate for capital goods.
- There should be an institution that does certification for professionals in this area.
- There is a need of socialization of the benefit of this technology to related industries that could be done by Ministry of Industry and AIBBI.
- There is a need of training for the operators and consultants for improving negotiation ability.
- There is a need of capable distributors for having spare parts from abroad.
- There is a need a standardized RBCS that could be done by Ministry of Industry and National Standardization Body (BSN).
- There is a need to improve the testing facilities that could be done by Ministry of Industry.
- There is a need to improve a capacity of negotiation for solving the IPR barrier.

## **2.2.4. Concrete actions plans and ideas**

### **2.2.4.1. Plans for domestic actions and measures**

#### **PV Technology**

- National PV Cell Industry Development with a minimum capacity of 50 MWp  
So far, a state owned industry of PT LEN (Persero) has engaged in laminating and packaging PLTS system. The company is located in Bandung of West Java Province. Development of national PV cell industry needs to be carried out as quickly as possible because the privately national industries of PV have still been the industries to make solar panels, laminated panels up to the panel control with a capacity of 50 MWp and significantly increase of PLTS needs. Therefore, the development of PV cell industry is absolutely needed. This development, in addition to strengthening the resilience of the national PV, will be able to lower the investment costs of PV. For that, a Presidential Regulation on the national PV industry development is required. Accordingly, the necessary coordination between the Ministry of Industry with other institutions and companies such as PT LEN Industry (Persero), Ministry of Research and Technology, Agency for the Assessment and Application of Technology, Ministry of State-Owned Enterprises, and Ministry of Finance has to be done for the implementation of the PV cell industrialization. The development of that national PV cell industry needs some requirements in accordance with applicable regulations.

- Increase of PLTS system testing capacity  
 Along with the increased use of PLTS, the PLTS system testing capacity owned by the Energy Technology Laboratory (B2TE), the Agency for the Assessment and Application of Technology (BPPT) needs to be improved their capacity. B2TE is located in Serpong, Tangerang Municipality, Banten Province is the only one testing laboratory for PLTS and its components owned by Indonesia that has been accredited with ISO / IEC 17025. B2TE has done testing for PV Module Components, Battery components, Battery Charge Regulator (BCR) components, and components of the DC lamp inverter. The equipment testing facilities owned by B2TE for PLTS and PLTS components testing are relatively limited, such as sun simulator, cycle test equipment, and electronic equipment. Those equipment components need to be increased in variety, quantity and capacity in order for B2TE to comply with international standards of IEC 61215 for photovoltaic modules testing. The testing equipment might be added with equipment for testing batteries, inverters, and others. Implementation of these activities under the coordination of BPPT can be done in the medium term of 3-5 years.
- Improvement of PV cell manufacturing laboratory  
 In Indonesia, there are two PV cell production laboratories: laboratory of thin film under the Bandung Institute of Technology, Department of Physics and laboratory of crystalline under Laboratory Electronics and Telecommunications Research Center (PPET), Indonesian Institute of Sciences (LIPI). Both laboratories are located in Bandung of West Java Province. The ability of PV cells laboratory of PPET-LIPI is for polycrystalline solar cells/ new multi-crystal with maximum efficiency of 10% for dimensions of 5x5 cm<sup>2</sup>. The low efficiency found is because it is carried out with limited and old enough (20-25 years) available equipment facilities and must be processed in the available laboratory room that is unclean. Despite the lower cell efficiency than that of commercial one, it can still be used for low-power PLTS such as for garden lighting, public lighting lamps or tower lamp. Silicon wafer (Si) used so far are imported from Germany with a dimension of 10x10 cm<sup>2</sup> and a minimum of 270 microns of thickness. Currently the thickness of Si wafers on the market is about 200 microns so that the facilities of available tools are no longer sufficient. To improve the efficiency of the cell it is required plasma etching and PECVD tools. In terms of human resources, PV cells laboratory of PPET-LIPI only owns as many as 8 employees and most of them enter retirement stage. Similar to the improvement of B2TE-BPPT cell laboratory, PPET-LIPI cell laboratory improvement can be done in coordination with LIPI. This activity can only be implemented after the determination of cell types are known so that it will be implemented in the medium up to long-term program.

### RBCS Technology

- Installation of RBCS in the selected steel industry  
 National steel production capacity reaches 8 million tons per year. The technology used is commonly conventional technology because the steel industry was built a long time ago in addition to its modifications within the framework of energy conservation is very limited. To that end, the potential use of RBCS in Indonesia is very potential, especially when considering the use of RBCS in other energy intensive industries. Selection of the steel industry for RBCS implementation will be determined based on the agreement between the Ministry of Industry and the Indonesian iron and steel industry association (AIBBI).