



**MEKONG RIVER COMMISSION**

**Basin-wide Strategy for  
Sustainable Hydropower Development  
for the Lower Mekong Basin**

An update for inclusion in the  
Basin Development Strategy 2021-2025

**Concept Note – Final Draft Version**

Revised 07 November 2017

**Document history – Case Study Report**

Version	Revision	Description	Issue date	Produced by
1	0	Draft Concept (Internal, PD)	31 January 2017	Voradeth Phonekeo Simon Krohn
1	1	Draft Concept (Internal, MRCS)	28 February 2017	Voradeth Phonekeo
	2	Draft Concept (Internal MRCS)	1 July 2017	Simon Krohn
2		Draft Concept (National Consultations)	10 July 2017	Planning Division
3		Concept Revised after National Consultations	31 October 2017	Planning Division
4		Concept Finalised after Regional Consultation	07 November 2017	Planning Division

## Contents

Contents.....	3
1 Summary.....	5
1.1 Objective of the Sustainable Hydropower Development Strategy (SHDS2018).....	5
1.2 Hydropower in the Strategic Plan 2016-2020.....	5
1.3 The Need for Sustainable Hydropower Strategy - Key Strategic Issues to be addressed in the SHDS2018 .....	5
1.4 Sustainable Hydropower Development Strategy (SHDS) requires Integrated Water and Energy Sector Planning with all Sectors .....	6
1.5 Proposed Approach to the Development of the SHDS2018.....	7
1.6 Design of Alternative Development Pathways .....	8
1.7 The Outputs of the SHDS .....	9
1.8 Time Line.....	10
1.9 Technical Team .....	10
1.10 Stakeholder Engagement.....	10
2 Introduction and Background .....	11
2.1 The Mekong Agreement of 1995 (MA95).....	11
2.2 Role of the MRC in Sustainable Hydropower Development (Period up to 2001) .....	11
2.2.1 The MRC Hydropower Principles 1998 .....	12
2.3 The MRC Hydropower Development Strategy 2001 .....	12
2.4 MRC Basin Plans and Initiative for Sustainable Hydropower (ISH) (Period 2001 to 2017).....	12
2.5 Status of Hydropower Development in the Lower Mekong Basin .....	13
2.6 The need for a Sustainable Hydropower Development Strategy .....	14
2.7 The Sustainable Hydropower Development Strategy and MRC Key Result Areas from Basin Development strategy 2016-2020.....	15
2.8 Hydropower in the Strategic Plan 2016-2020.....	15
3 Objective, Principles and Key Strategic Issues of the SHDS 2018 .....	17
3.1 Objective of the SHDS2018.....	17
3.2 Principles on Hydropower Cooperation (Proposed for SHDS2018).....	17
3.3 Key Strategic Issues to be addressed in the SHDS2018 .....	17
3.4 Additional considerations for Transboundary Cooperation .....	18
3.4.1 Joint activities for sustainable planning and management: .....	18
3.4.2 Monitoring and coordination of HP developments:.....	18
4 Methodology for the development of the SHDS2018 .....	19
4.1 SHDS2018 as Input to the Basin Planning Cycle 2021-2015 .....	19
4.2 Joint and Integrated Planning .....	20

4.3	Design of Alternative Development Pathways .....	21
4.3.1	Integrated National and Regional Power Planning.....	21
4.3.2	Integrated Water Sector Planning .....	22
4.4	Technical Evaluation Methodology.....	24
4.4.1	Framework to Guide Approach.....	25
4.4.2	Proposed Process for Interactive and Iterative Development of the SHDS2018 .....	25
4.5	The Outputs of the SHDS .....	27
5	Team Structure and Stakeholder Groups .....	29
5.1	Technical Support Team .....	29
5.2	Stakeholder Engagement.....	29
5.2.1	Internal Secretariat Support .....	29
5.2.2	Joint Committee and Council.....	29
5.2.3	National Mekong Committees .....	30
5.2.4	External Stakeholders .....	30
6	Key Steps in the development of SHDS2018 .....	31
	Appendix 1: The MRC Hydropower Principles 1998 .....	32
	Appendix 2: Framework for Consideration of Basin-Wide and Trans-Boundary Concerns for the SHDS2018.....	33

## 1 Summary

### 1.1 Objective of the Sustainable Hydropower Development Strategy (SHDS2018)

***Objective of the Sustainable Hydropower Development Strategy 2018:***

***Optimal and sustainable hydropower development pathway alternatives are explored, proposed and discussed with Member Countries – taking into account opportunities to enhance benefits beyond national borders and minimise adverse transboundary impacts while supporting water, food and energy security.***

### 1.2 Hydropower in the Strategic Plan 2016-2020

The Strategic Plan 2016-2020 underlines the rising sense of urgency among stakeholders for **the need to move basin development towards more “optimal” and sustainable outcomes that can address long-term needs**, including environmental protection as well as ensuring water, food and energy security.

The Strategic Plan 2016-2020 with its basin wide perspective has provided, in the Annex A for the Output 2.1, some thoughts on the nature of the Basin-wide strategy for sustainable hydropower development:

- i. *‘Energy from hydropower projects plays an important role in each of the LMB country’s energy supply mix and also contributes to the growing regional inter-dependency from cross-border energy trading.*
- ii. *At the same time, the reservoir storage provided by these projects helps to regulate mainstream flows from the wet to the dry season, opening up opportunities for increased dry season abstractions and potentially for flood control. However, hydropower development has adverse transboundary impacts as well, e.g. on capture fish migration, rural livelihoods and sediment movement.*
- iii. *From a basin wide perspective, national plans are sub-optimal as they do not take into account opportunities to enhance benefits beyond national borders and minimise adverse transboundary impacts. According to MRC and other assessments, the location, number and size of mainstream and tributary hydropower have differing impacts across the basin.*
- iv. *Taking into account regional energy needs (GMS and ASEAN integration agenda), national economic development priorities, comparative national advantages in hydropower development, the development of storage for flood and drought management, and the preservation of key environmental assets for economic, social and environmental purposes, **a basin-wide strategy is needed to address the difficult trade-offs and to design more optimal and sustainable hydropower development pathways. The basin-wide strategy will support improvement of national sector planning and contributes to the overall Basin Development Strategy’.***

### 1.3 The Need for Sustainable Hydropower Strategy - Key Strategic Issues to be addressed in the SHDS2018

The findings from Basin Development Strategy 2011-2015 and the related Scenarios Assessment (MRCS, 2011) indicated that the national development plans are sub-optimal. There are several areas for improved benefits beyond national boundaries and opportunities to minimise transboundary

impacts. Many of the opportunities to enhance benefits beyond national boundaries arise from cross sector integrated planning and cooperation.

The draft findings of the Council Study (currently nearing completion in 2017) have further confirmed that there are significant and important opportunities to reduce transboundary impacts through the reconsideration of hydropower development plans.<sup>1</sup>

The MRC's study on Guidelines on Mitigation of Hydropower Impacts on Mekong Mainstream and Tributaries (MRCS, 2017 in press) has drawn attention to several siting, design and operational alternatives that can reduce these transboundary impacts.

Therefore, to achieve the Outcomes set out in the agreed MRC Strategy Plan 2016-2020, the strategic issues raised in the above studies must be addressed by the SHDS2018 to lead to potential measures/solutions to overcome the Basin concerns, needs and challenges<sup>2</sup>:

- ⇒ Support the **economic development** objectives of member countries (including navigation)
- ⇒ Protect and enhance **water, food and livelihood security**
- ⇒ Increase **resilience against Climate Change** including drought and flood management
- ⇒ Ensure continued **energy security** for all member countries
- ⇒ **Protection of valued ecosystems**
- ⇒ Further develop **trans-boundary cooperation**

#### **1.4 Sustainable Hydropower Development Strategy (SHDS) requires Integrated Water and Energy Sector Planning with all Sectors**

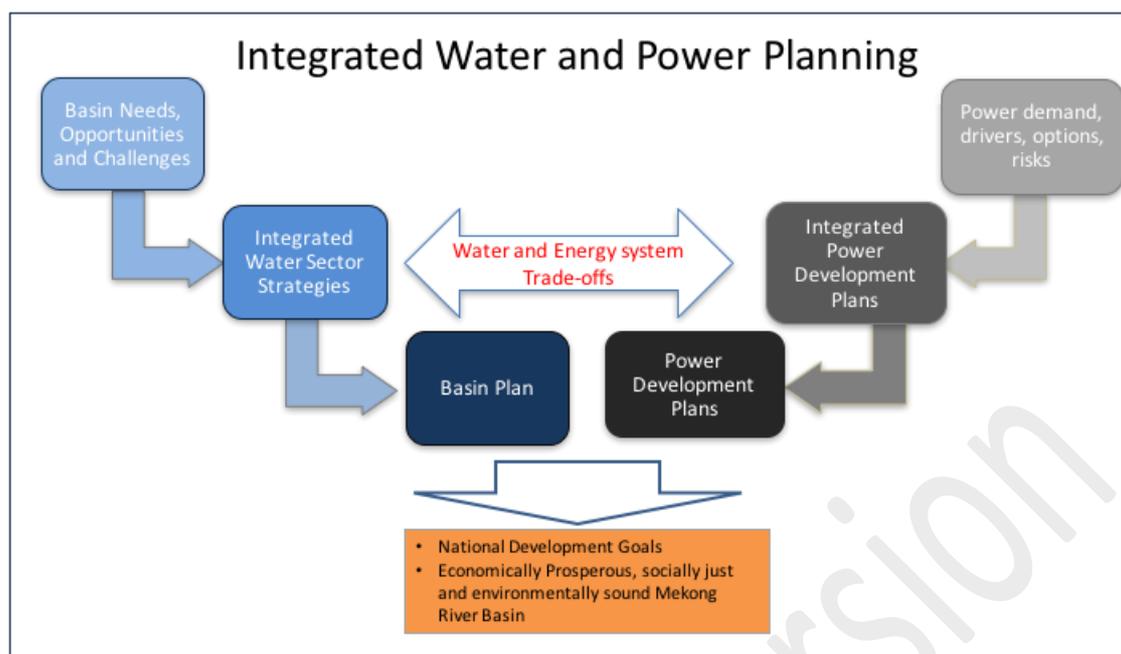
The national plans for the development of hydropower arise from the need for energy in each of the rapidly developing member countries. This is a critical strategic issue for each Member Country. These Power Development Plans will have generally been developed without full consideration of the cross sectoral benefits that arise from alternative power development pathways. In addition, alternative PDPs may have reduced impact on food security and natural ecosystems. SHDS is only one part of the Energy Strategy of a given country. Therefore, it must be considered with all sectors in the context of national plan and ASEAN development of the power grid.

The SHDS aims to provide an Interactive Planning process to allow consideration of alternative cross sectoral plans that may achieve the above Strategic Objectives of all Member Countries.

---

<sup>1</sup> The details of these opportunities to be presented to Member Countries at Regional Consultation 6<sup>th</sup> November 2017.

<sup>2</sup> Basin Development Strategy (2016-2020), MRC (2016)



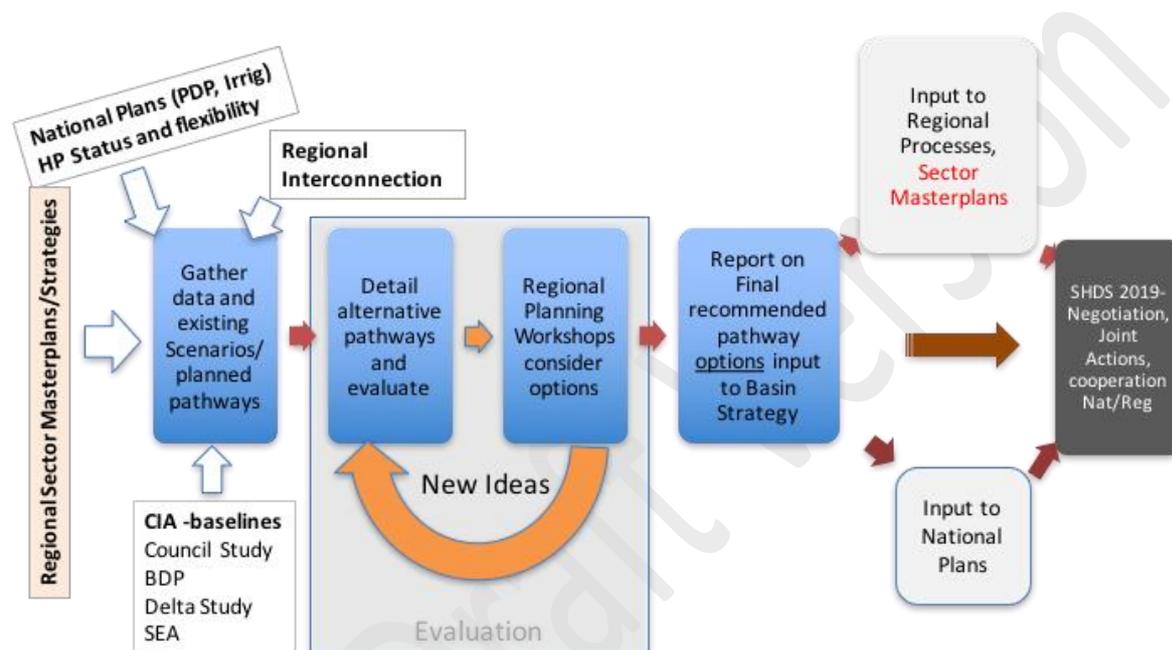
## 1.5 Proposed Approach to the Development of the SHDS2018

The following steps are proposed in the development of the SHDS2018;

1. Assemble information from the Council Study, ISH studies<sup>3</sup>, and other relevant sources to provide a detailed knowledge base to underpin the SHDS;
2. Assemble all information of other LMB and regional sector strategies as they relate to the SHDS (e.g. Power Development, Fisheries, Navigation, Environment, Flood and Drought, Climate Change);
3. Noting the outputs from the Council Study and, in collaboration with other sectors, consider an initial set of alternative sustainable hydropower development pathways that may achieve the SHDS Objective;
4. On the basis of the above previous studies, carry out a desktop preliminary evaluation of the alternative development pathways to understand trade-offs in costs and benefits and their ability to meet Basin Planning Needs, Opportunities and Challenges;
5. Make particular reference to alternative economic energy options;
6. Facilitate Interactive Planning Workshops with MC to explain the development pathways and determine if further pathways should be considered;
7. Do a second preliminary evaluation and documentation of alternative pathways based on the outputs of the Workshops and document their characteristics;
8. Facilitate follow-up Interactive Planning Workshops with MC to explain the development pathways and implications for changes to national plans;

<sup>3</sup> <http://www.mrcmekong.org/about-mrc/completion-of-strategic-cycle-2011-2015/initiative-on-sustainable-hydropower/>

9. Map out negotiation strategies to arrive at mutually beneficial SHDS across energy, water and food sectors;
10. Present development pathways with their impact on basin Needs, Opportunities and Challenges (using Basin Indicator Framework) to MC for consideration as part of the Basin Development Planning process;
11. Part of the SHDS Technical Team will participate in the Basin Planning Process (2021-2025) with other sectors to consider if there are alternative strategies that may be appropriate at a Basin Scale;
12. The SHDS Technical team documents final agreed SHDS2018 and input to the BDS.



## 1.6 Design of Alternative Development Pathways

Alternative Development Pathways are proposed to be designed by the Technical Team in consultation with Member Countries and Stakeholders, aimed at achieving the SHDS Objective and may include:

- Alternative regional energy generation, integration and interconnection options to respond to regional demand and optimise the use of existing and planned hydropower;
- Alternative siting, design and operations for hydropower projects in the planning stage;
- Inclusion of potential flood and drought management options for existing and planned projects;
- Alternative governance, coordination and optimisation of mainstream and tributary hydropower cascades;
- Avoidance, Mitigation and Compensation options to be built in to LMB SHDS;
- Strong linkage to the Strategies and Masterplans for other sectors; and
- Other factors deemed important by the MRC MC.

### Development Pathway Definition

“Development Pathways” are similar to the “Scenarios” used in the Basin Planning process 2011-2015 (BDP2). In BDP2 the national sector plans were taken as fixed, as they were presented by the Member Countries. They were not changed and no attempt was made to suggest alternatives basin scale “optimisation”<sup>4</sup> of plans for infrastructure, irrigation etc. The “Scenarios” were taken “as is” and evaluated. The resulting recommendation were qualitative and essentially pointed to the need for additional studies and additional information to clarify the findings of BDP2.

In 2017 the MRC is 8 years further advanced in its knowledge of the costs and benefits of the combined national plans, particularly through the Council Study and a number of other ISH and other sector related studies. Much more is known about the mainstream dam designs and design options; additional information and data has been collected in the basin.

Therefore, the SP 2016-2020 proposed a much more quantitative consideration of the sustainable hydropower development strategy and its integration to the other sector strategies as set out in this Concept Note. Alternative options were to be considered to “optimise” benefits and reduce transboundary impacts.

Development Pathways are intended to be more **exploratory** in nature; choices and options are intended to remain **open**. Trade-offs can be discussed for later evaluation..

## 1.7 The Outputs of the SHDS

Specific Outputs from the Sustainable Hydropower Development Strategy will be:

- ⇒ ***Documented alternative sustainable hydropower development pathways for more optimal development for hydropower resources of the Mekong mainstream and its tributaries;***
- ⇒ ***A description of opportunities to enhance benefits beyond national borders and avoid, minimise or mitigate adverse transboundary impacts; and***
- ⇒ ***Inputs to crosscutting strategies of other sectors to benefit the Basin Planning process for 2021 to 2025.***
- ⇒ ***Agreed set of follow-up Strategic Actions detailed to ensure the delivery of the SHDS objective.***

In addition, an agreed set of **Strategic Actions** will be detailed to ensure the MRC is able to deliver on the expectations of the MC towards the SHDS objective and the implementation of a preferred Sustainable Hydropower Development Strategy.

---

<sup>4</sup> the word “optimisation” is placed in inverted commas to be clear that true numerical optimisation will not be possible. However, a clear set of quantitative basin scale objectives will need to be set by MC to allow even nominal “optimisation” of integrated sector plans in the next BDP process.

**NOTE:** The major assumption in this work is that the Member Countries are prepared to consider changes to national sector plans to achieve the objective of the Basin Strategy. This may include changes to the PDPs, Irrigation, Agriculture, Fisheries Management strategies, etc to arrive at a greater overall benefit to the Member Countries. For example, a country may select an alternative site for hydropower and a new design to achieve greater transboundary benefits (e.g. reduced flooding, better fisheries management). Another country may select a reduced hydropower component in their PDP, to reduce unwanted impacts at a basin scale and instead use another source of energy if it is considered economical. The benefits of regional integration of power grids will be an important consideration.

## 1.8 Time Line

The indicative timeline is to have the Main Draft of the **SHDS available at the end of 2018** for input to the Basin Development Strategy Process. Final documentation may be submitted to the Joint Committee for approval for submission to Council in March 2019. Approval by the Council via written communication is proposed by April 2019.

## 1.9 Technical Team

It is proposed that a well-qualified technical team be sourced from a **reputable consulting firm (or consortium of skilled individuals)** with skills in all the required areas of modelling, evaluation, hydropower, economics, environment and socio-economics. The team will need to have close understanding of the Council Study and MRC DSF.

## 1.10 Stakeholder Engagement

Engagement of NMCs, regional stakeholders and regional agencies will be vital to success of this work. An appropriate Stakeholder approach will need to be employed by the selected team.

## 2 Introduction and Background

The intent of this Concept Note paper (CN) is to confirm the necessity to update Sustainable Hydropower Development Strategy as stated in the MRC Basin Development Strategy and the Strategic Plan 2016-2020 and then to propose a methodology for the preparation of the updated Sustainable Hydropower Development Strategy. The Secretariat will be consulted first on the content of this CN prior to submitting it to the four Member Countries (MCs) for their opinion, guidance and suggestions. The Objective and Principles will also be presented to the JC and the Council for their guidance and information.

Finally, the content of this CN will serve as reference for the preparation of a Term of Reference (TOR) which will be used to recruit an experienced international consultant team to assist the preparation of the content of an updated Sustainable Hydropower Development Strategy by the end of year 2019 (SHDS2018). This TOR will be finalised only after the content of the CN has been accepted by the four Member Countries.

The CN covers the background of the MRC's involvement in hydropower and basin planning and describes a list of key issues surrounding this development opportunity that are emerging from the rapid development in the Mekong Basin. A methodology is proposed to develop an update to the Sustainable Hydropower Development Strategy that closely links to the overall Mekong Basin Strategy and the social, economic and environmental trade-offs that are emerging. The Strategy must be completed and submitted to the MRC Joint Committee for consideration and endorsement and approval of the MRC Council by the mid of 2019.

### 2.1 The Mekong Agreement of 1995 (MA95)

The role of the MRC, in developing a Sustainable Hydropower Development Strategy, must be to facilitate co-operation in this sector as guided by the articles of the MA95.

**Article 1** of the Agreement expresses the intention of the four states to cooperate in all fields of sustainable development, utilisation, management and conservation of water and related resources of the Mekong river basin, including: irrigation, hydropower, navigation, flood control, fisheries, timber floating, recreation and tourism.

The article also states that activities should be carried out in a manner that optimises multiple-use and mutual benefits, and minimises harmful effects.

The latter is reinforced in **Article 3** which speaks of protection of the environment and ecological balance.

**Article 2** emphasises joint and/or basin-wide development projects and basin programmes through the formulation of a Basin Development Plan which would be used to identify, categorise and prioritise the projects and programmes to seek assistance for and to implement at the Basin level.

**Article 5** provides for the reasonable and equitable use of the waters of the river system with reference to rules for water utilisation to be prepared.

### 2.2 Role of the MRC in Sustainable Hydropower Development (Period up to 2001)

In the period leading up to the development of first Sustainable Hydropower Development Strategy in October 2001 (HDS2001), the MRC was generally focused on investigation and an assessment of individual projects and the development opportunity space for hydropower development. These investigations were focused on the engineering feasibility and economics of the projects with less attention to the environmental and social consequences.

With the signing of the MA95, the Mekong River Commission (MRC) in its present form was established. The mandate of the Commission since 1995 is to co-operate and promote sustainable development, utilisation, management and conservation of the water and related resources of the Mekong River Basin for the economic and social well-being of the people in all the riparian countries. The awareness of the environmental and social consequences of major infrastructure development were becoming evident and were renewed following the World Commission on Dams (WCD) recommendations.

### 2.2.1 The MRC Hydropower Principles 1998

To accommodate the changes in the MRC mandate and in the prevailing conditions in the Lower Mekong Basin, the Council of MRC in 1998 approved five principles to guide national and regional cooperation on hydropower. These principles (included as Appendix 1) promoted information exchange among member states and close cooperation with international agencies. They emphasised the need for integrated water resource planning and the use of good practice cumulative impact assessment techniques and public participation to guide the effective use of natural resources. The private sector was encouraged to participate in the development of the hydropower sector while properly taking into consideration the social and environmental consequences.

These principles will need to be re-considered and re-confirmed as part of development of the MRC SHDS2018. A draft revised set are included in Section 3.2 for consultation with the JC and Council.

### 2.3 The MRC Hydropower Development Strategy 2001

The five principles in Appendix 1 formed the foundation for the formulation of the MRC Hydropower Development Strategy in 2001(HDS2001). HDS2001 defined three strategy areas for the MRC to work on being:

**Strategic Area 1:** Consideration of Integrated Water Use, Environmental and Socio-economic Factors:

**Strategic Area 2:** Efficient Hydropower Generation and Distribution Mechanisms

**Strategic Area 3:** Information System and Capacity Building

The results emerged in the form of a variety of Studies, Guidelines and Tools which were used to provide guidance for MRC involvement in hydropower activities in the Basin including the provision of inputs for the Basin Development Plan. In addition, these principles guided the work of the former MRC Core Programmes on Water Utilisation and the Environment, as well as the relevant Sector Programmes such as the Fisheries Programme, the Agriculture, Irrigation, and Forestry Programme, the Navigation Programme, etc..

### 2.4 MRC Basin Plans and Initiative for Sustainable Hydropower (ISH) (Period 2001 to 2017)

Since the emergence of the HDS2001, a number of the recommended outputs/activities included in the HDS2001 strategy were implemented together with an additional amount of work completed by the former MRC programmes.

However, the rapid development of the HP and other sectors continued to put pressure on the natural resources of the basin making integrated water and power planning even more vital. The concept of the “nexus between water, food and energy” has become commonly debated emphasising the need for integrated planning as per the MRC mandate. These concepts will need to be central to the formulation of SHDS2018 assessment.

The formulation and implementation of the Initiative for Sustainable Hydropower (ISH) was a key strategic intervention by the MRC toward fulfilment of the MRC role in the hydropower sector. ISH further advanced and implemented many of the strategies proposed in the HDS2001.

During the period 2008-2015, regional stakeholders acknowledged the substantial ISH/MRC efforts towards fulfilment of the role of MRC in the hydropower sector particularly with the implementation of:

- ⇒ the Strategic Environment Assessment for the proposed Mainstream Hydropower dams (MRC-SEA)
- ⇒ the drafting of the Preliminary Design Guidance (PDG) and its application, through the PNPCA process, on three Mainstream dams project namely Xayabury (in 2011), Don Sahong (in 2015) and Pak Beng (in 2017)
- ⇒ extensive training and trial of the Rapid Sustainability Assessment Tool (RSAT) for hydropower development in a Basin Wide context.
- ⇒ Development of a comprehensive range of hydropower planning and development tools to raise the capacity of developers and member country government departments to better implement hydropower in a more sustainable manner.

In addition, the MRC has embedded this knowledge in the Basin Development Plan 2011 to 2015 (BDP2) and associated Scenario Analysis to understand the integrated costs and benefits of multi sector development in the Mekong Basin.

The MRC Council Study (*Study on the Sustainable Management and Development of the Mekong River including Impacts of Hydropower Projects (MRC, 2017, in progress)*) is investigating the integrated cumulative impacts of all development in the Mekong Basin to be completed in 2017. The outputs of this study will be an important input to the SHDS2018.

## 2.5 Status of Hydropower Development in the Lower Mekong Basin

Over the past decade, the national policies of member countries have emphasised the need to extend access to electricity to underpin poverty reduction strategies, improve regional energy security, reduce vulnerability to international energy price shocks and generate export earnings in countries such as Cambodia and Laos. These factors have led to accelerated development of hydropower and large investment in electrical infrastructure in the Lower Mekong Basin. Hydropower development is expanding on the Mekong mainstream and in tributaries and it is likely to intensify in the near future.

In 2001 there were approximately 17 hydropower projects in operation in the LMB with a capacity of less than 1,400 MW. During the period from 2002 to 2015 there were additional 40 hydropower projects built to provide a generation capacity of 6,442 MW. While some 14 dams with a total capacity around 3,000 MW are planned for commissioning during the period 2016-2020, another series of 30 dams with a total capacity around 6,653 MW are under planning status with the majority finalising Feasibility Studies.

Three mainstream dams have been submitted to the MRC under the PNPCA. The construction of the 1285MW Xayaburi Project is 80% complete and is expected to be commissioned in 2019, while the Don Sahong (260MW) will be commissioned in 2019. The Pak Beng project (912 MW) has recently completed the PNPCA review and, while there are substantial issues to be dealt with in a Joint Action Plan, the expectation is that this project will be commissioned by 2023 (TBC).

There are significant major hydropower investments planned in the LMB:

- ⇒ Lao PDR has signed agreements with its neighbours to supply power, as follows:
  - 9000 MW to Thailand by 2025
  - 5000 MW to Vietnam by 2030
  - 1500 MW to Cambodia by 2025
- ⇒ Cambodia is progressing with feasibility studies on the major mainstream developments in the Mekong floodplain (e.g. Sambor 2000 to 3000MW)

China has completed nine major hydropower dams on the upper Mekong (Lancang) with a capacity of 15,700 MW and large inter-annual storage. A further 11 projects are under construction with a capacity of 11,800MW. In addition, there are another 10 projects planned in the upper basin with a capacity of approximately 3800MW.

## 2.6 The need for a Sustainable Hydropower Development Strategy

The rapid and large-scale development of hydropower in the Upper and Lower Mekong Basin, as detailed above, is forecast to have a substantial impact on the economic, social and environmental condition in the Mekong basin. The net economic benefits of these developments, once fully developed, is estimated to have a Net Present Value (NPV) of over \$30bn to the regional economies<sup>5</sup>. However, it is also known that hydropower and other basin developments (e.g. irrigation) impact the natural resources across the basin. For example, the loss in capture fisheries alone estimated to be of the order of NPV \$2bn. The resulting socio-economic impacts are not equally shared across the MRC Member Countries and are inevitably borne by those who are most dependent on river fisheries and are vulnerable to these major changes to their livelihoods.

The MRC has studied alternative development pathways as part of the *Assessment of Basin-wide Development Scenarios*<sup>6</sup>. In this analysis, a range of Development Scenarios were considered and the benefits and costs analysed. Focusing particularly on main stream dams, this analysis allowed a comparison of the relative impacts of the alternative Scenarios on environmental and socio-economic indicators. Under the “LMB Long Term Development Scenario” with the Lancang hydropower development and all planned LMB mainstream and tributary dams, the loss in capture fisheries was estimated to be 1000kt/year, or 40% of the yield. The majority of this loss was shown to be affecting Cambodia.

Importantly, the Scenario Assessments of the MRC also show that some mainstream hydropower developments have more impact on the fisheries than others<sup>7</sup>. The development of the hydropower projects in the Cambodian floodplain was shown to be a major contributor to this loss in capture fisheries. The MRC report indicates that 4.5million people would be at risk of losing livelihoods with a “Severely Negative” impact on livelihoods to those riparian residents.

**These major trade-offs in economic, environmental and social values (water, food and energy) is a major focus of this Sustainable Hydropower Development Strategy.**

MRC studies and regional and international research recommend that basin-wide cooperation, integrated development planning, development and management is essential to achieve basin scale sustainable development and is critical for the Mekong Basin.

It is evident from these other basins that without cooperation and joint action a river basin with many hydropower projects may face the potential for conflict, putting hydropower projects at serious financial risk and leading to potential threats of implementation delay and even project abandonment. This may mean that national energy targets are not met at national level with threats to industrial and also socio-economic development targets and potentially civil unrest in areas where the socio-economic impacts are felt most acutely.

---

<sup>5</sup> Assessment of Basin-wide Development Scenarios, Main Report April 2011.

<sup>6</sup> Assessment of Basin-wide Development Scenarios, Main Report April 2011

<sup>7</sup> Figure 29, page 59, Assessment of Basin-wide Development Scenarios, Main Report April 2011

The intention is that alternative hydropower development pathways are properly considered in this SHDS so that the trade-offs between economic, social and environmental factors and the “energy, water and food nexus” are understood and openly discussed between Member Countries with a view to a balanced Basin Development Strategy.

## 2.7 The Sustainable Hydropower Development Strategy and MRC Key Result Areas from Basin Development strategy 2016-2020

For the next five years, the MRC will focus its work in delivering outcomes under four key result areas. These represent concrete and highly focused priority areas that MRC seeks to influence to advance its mission and role as a regional river basin organization in the Mekong.

### Key Result Areas and their outcomes

I. Enhancement of national plans, projects and resources from basin-wide perspectives
II. Strengthening of regional cooperation
III. Better monitoring and communication of the Basin conditions
IV. Leaner River Basin Organisation

The “Key Result Area 1(KRA1)” (Enhancement of national plans, projects and resources from basin-wide perspectives) relates to the role that MRC plays in informing the development of plans and projects by Member Countries that affect, directly or indirectly in a positive or adverse manner, the management of the basin. Under KRA1, three strategic outcomes for the period of this plan are targeted:

**Outcome 1:** Increased common understanding and application of evidence-based knowledge by policy makers and project planners

**Outcome 2:** Environment management and sustainable water resources development optimized for basin-wide benefits by national sector planning agencies

**Outcome 3:** Guidance for the development and management of water and related projects and resources shared and applied by national planning and implementing agencies

## 2.8 Hydropower in the Strategic Plan 2016-2020

The BDS and SP underline the rising sense of urgency among stakeholders for **the need to move basin development towards more “optimal” and sustainable outcomes that can address long-term needs**, including environmental protection as well as ensuring water, food and energy security.

The Strategic Plan 2016-2020 with its basin wide perspective has provided, in the Annex A for the Output 2.1, some thoughts on the nature of the Basin-wide strategy for sustainable hydropower development:

- v. *‘Energy from hydropower projects plays an important role in each of the LMB country’s energy supply mix and also contributes to the growing regional inter-dependency from cross-border energy trading.*
- vi. *At the same time, the reservoir storage provided by these projects helps to regulate mainstream flows from the wet to the dry season, opening up opportunities for increased dry season abstractions and potentially for flood control. However, hydropower development has adverse transboundary impacts as well, e.g. on capture fish migration, rural livelihoods and sediment movement.*

- vii. *From a basin wide perspective, national plans are sub-optimal as they do not take into account opportunities to enhance benefits beyond national borders and minimise adverse transboundary impacts. According to MRC and other assessments, the location, number and size of mainstream and tributary hydropower have differing impacts across the basin.*
- viii. *Taking into account regional energy needs (GMS and ASEAN integration agenda), national economic development priorities, comparative national advantages in hydropower development, the development of storage for flood and drought management, and the preservation of key environmental assets for economic, social and environmental purposes, **a basin-wide strategy is needed to address the difficult trade-offs and to design more optimal and sustainable hydropower development pathways. The basin-wide strategy will support improvement of national sector planning and contributes to the overall Basin Development Strategy**.*

## 3 Objective, Principles and Key Strategic Issues of the SHDS 2018

### 3.1 Objective of the SHDS2018

The Sustainable Hydropower Development Strategy will be developed to promote and implement a clear objective, principles and action plan at national and regional level towards an agreed basin scale objective.

Given the MRC Strategic Plan 2016-2020 and the above context for the SHDS2018, the following Objective Statement is proposed:

***Objective of the Sustainable Hydropower Development Strategy 2018:***

***Optimal and sustainable hydropower development pathway alternatives are explored, proposed and discussed with Member Countries – taking into account opportunities to enhance benefits beyond national borders and minimise adverse transboundary impacts while supporting water, food and energy security.***

### 3.2 Principles on Hydropower Cooperation (Proposed for SHDS2018)

The following Principles are proposed to guide the MRC Member Countries in the development of the SHDS 2019. These Principles are modified from those adopted by the Council in 1998.

- (1) *Planning and operational hydropower Information is exchanged among the MRC member states as well as the GMS;*
- (2) *Close co-operation with international institutions, such as the Greater Mekong Sub-Region, ASEAN, Lancang Mekong Cooperation and multilateral funding agencies on regionally integrated energy and network planning and suitable options for sustainable development of hydropower projects within that context;*
- (3) *MRC's approach will focus the sustainable hydropower development strategy on IWRM based planning of the mainstream and tributary hydropower towards the stated Objective of the Sustainable Hydropower Development Strategy 2019. The basin-wide strategy will support improvement of national energy and water sector planning and contributes to the overall Basin Development Strategy.*
- (4) *The MRC Sustainable Hydropower Strategy would thus also inform the ongoing preparation of a regional energy generation and transmission network expansion planning and power trade;*
- (5) *Good practice cumulative environmental and socio-economic impacts assessment, contemporary Design Guidance as well as a mechanism for public participation by stakeholders, should guide the MRC in its efforts to promote the most effective use of the natural resources in the Lower Mekong Basin; and*
- (6) *MRC should encourage the private sector to intensify its efforts to implement sustainable hydropower development practice in the basin with proper consideration to the environment and the well-being of the people living in the Basin.*

### 3.3 Key Strategic Issues to be addressed in the SHDS2018

The findings from Basin Development Strategy 2011-2015 and the related Scenarios Assessment (MRCS, 2011) indicated that there are national development plans are sub-optimal. There are several

areas for improved benefits beyond national boundaries and opportunities to minimise transboundary impacts. Many of the opportunities to enhance benefits beyond national boundaries arise from cross sector integrated planning and operation.

The draft findings of the Council Study (currently nearing completion in 2017) have further confirmed that there are significant and important opportunities to reduce transboundary impacts through the reconsideration of hydropower development plans.

The MRC's study on Guidelines on Mitigation of Hydropower Impacts on Mekong Mainstream and Tributaries (MRCS, 2017 in press) has drawn attention to several siting, design and operational alternatives that can reduce these transboundary impacts.

Therefore, to achieve the Outcomes set out in the agreed MRC Strategy Plan 2016-2020, the strategic issues raised in the above studies must be addressed by the SHDS2018 to lead to potential measures/solutions to overcome the Basin concerns, needs and challenges<sup>8</sup>:

- ⇒ Support the **economic development** objectives of member countries (including navigation)
- ⇒ Protect and enhance **food and livelihood security**
- ⇒ Increase **resilience against Climate Change** including drought and flood management
- ⇒ Ensure continued **energy security** for all member countries
- ⇒ **Protection of valued ecosystems and ecosystem services**
- ⇒ **Further enhance trans-boundary cooperation**

### 3.4 Additional considerations for Transboundary Cooperation

#### 3.4.1 Joint activities for sustainable planning and management:

For joint activities to be successful, the sharing of information and learning experiences, in a structured and timely manner, should be established. Therefore, joint planning and data/information sharing through increased trans-boundary cooperation can help to produce optimal and high economic benefits with the minimal environmental impacts to the LMB;

#### 3.4.2 Monitoring and coordination of HP developments:

The matter of monitoring and coordination are very important particularly in the case where efficient coordination is to be assured between different parties (MRC, the host country/government, dams owners, dam operators, local communities, aid agencies, relief organizations, etc.)

Owing to the fact that the proposed mainstream dams will be built in cascade and owned by different owners the communication exchanges between each dam can become complicated. Therefore, additional common rules and regulations covering all important coordination aspects of dams operation will be necessary. These additional rules and regulation for all dams in the cascade may cover for example: the common Operating rules and Emergency procedures.

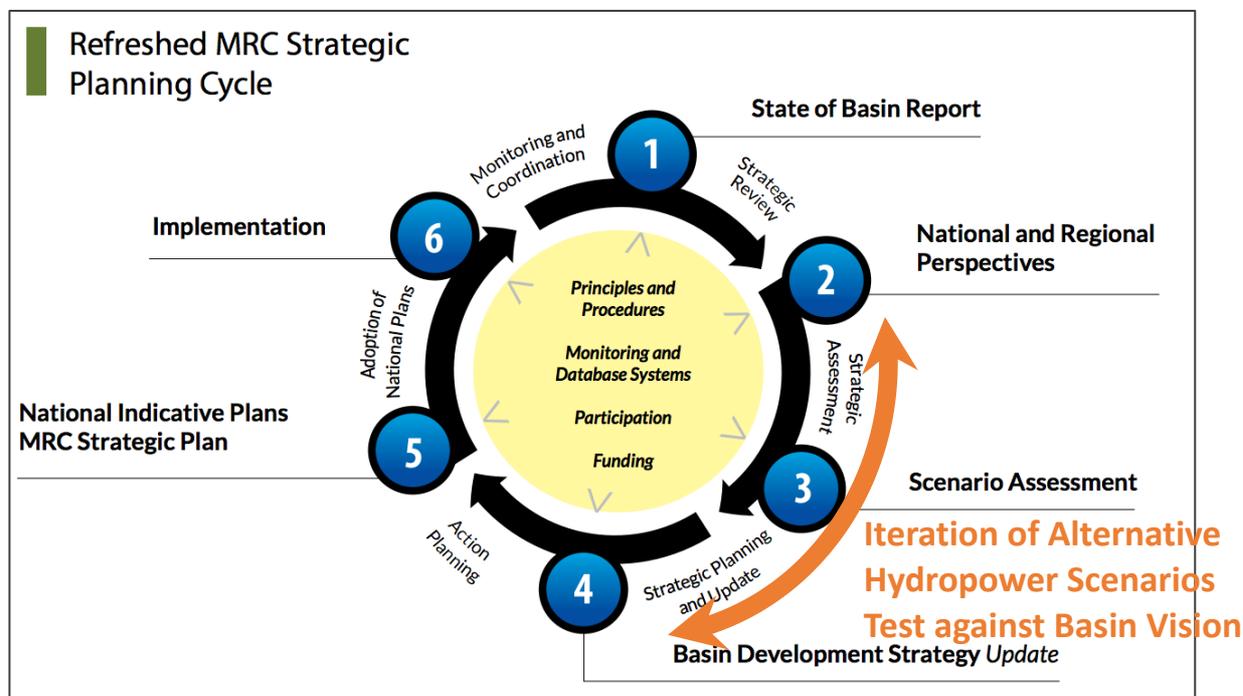
---

<sup>8</sup> Basin Development Strategy (2016-2020), MRC (2016)

## 4 Methodology for the development of the SHDS2018

### 4.1 SHDS2018 as Input to the Basin Planning Cycle 2021-2015

The Development of the SHDS2018 is embedded in the Planning Cycle used to develop the BDP 2021-2025. It is expected that the next Planning Cycle will follow a similar process as shown below.



The SHDS work is essentially positioned between Steps 2, 3 and 4 in the above Planning Cycle.

**State of Basin:** The BDP reports on Status and Trends in the Mekong Basin<sup>9</sup> (MRC, 2016), the State of the Basin Report and other relevant and tested information sources provide the relevant baseline information. Scenario Assessments have been undertaken in the Council Study and previously in the BDP2. It is envisaged that further Scenario testing of alternative Scenarios will be undertaken iteratively during and after the development of the SHDS to arrive at recommendations of alternative development pathways that may be put to decision makers (JC and Council).

**National and Regional Perspectives** essentially come from the National Plans for Power Development (PDP) and the National Indicative plans (NIPS) for other water resource developments. These may be partly gathered for the Council Study and Basin Planning work done in recent years, updated to reflect recent national priorities.

**The SHDS is proposed to be a component of an interactive participatory planning stream and part of the Basin Development Strategy Process** – to engage with cross sector, MRC relevant, regional stakeholders and sectors (NMCs, government agencies, relevant NGO and community groups) to achieve the Objective of the SHDS2018 and the Basin Strategy.

<sup>9</sup> Development trends and future outlook in the Lower Mekong Basin Countries; *Working document* (MRC, October 2015)

The SHDS2018 Process is intended to provide **alternative development pathways (Future Scenarios)** that may be proposed to achieve the Objective of the SHDS2018 as input to the Basin Development Plan 2021-2025.

The intention is that the outcomes of these alternative development pathways are tested against the Basin Needs, Opportunities and Challenges through the agreed Basin Indicator Framework. Revised National and Basin Plans may be proposed by the Planning Team in the Basin Strategy 2021-2025.

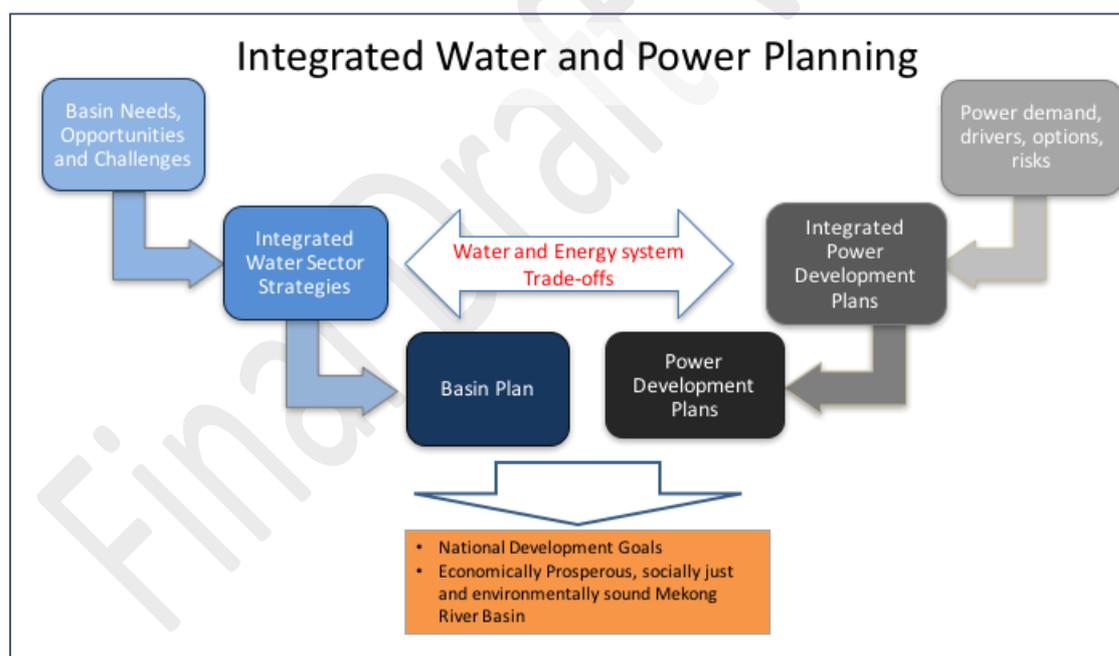
## 4.2 Joint and Integrated Planning

Joint and Integrated planning, to be implemented with the use of IWRM principles, is proposed to be a key feature of the development of the SHDS2018. The SHDS should be developed in a consultative, cooperative and integrated manner maximising the development opportunity at a national and regional level while dealing with the significant risks and impacts.

### Link Energy and Water Planning

To properly reach the Objective and Principles of the SHDS2018, the implementation approach needs to clearly connect the regional energy and water planning frameworks at a whole of system scale. The approach must consider the power system design, meeting energy and capacity requirements for economic growth of member states while enhancing multisector water management opportunities and minimising risks to valued ecosystems. Development pathways selected should reduce impact on food security and improve livelihoods at a local and basin scale.

**Figure 1: Integration of Water and Energy Sector Strategies to meet basin Needs and Challenges**



Integrated Water Resource Planning will need to ensure that the sector strategies are aligned and the trade-offs understood at a basin scale.

### 4.3 Design of Alternative Development Pathways

Alternative Development Pathways are designed by the Technical Team in consultation with Member Countries and Stakeholders aimed at achieving the SHDS Objective and may include:

- Alternative regional energy generation, integration and interconnection options to respond to regional demand and optimise the use of existing and planned hydropower;
- Alternative siting, design and operations for hydropower projects in the planning stage;
- Inclusion of potential flood and drought management options for existing and planned projects;
- Alternative governance, coordination and optimisation of mainstream and tributary hydropower cascades;
- Avoidance, Mitigation and Compensation options to be built in to LMB SHDS;
- Strong linkage to the Strategies and Masterplans for other sectors; and
- Other factors deemed important by the MRC MC.

The linkages to sector strategies are proposed in the following sections.

#### 4.3.1 Integrated National and Regional Power Planning

##### [Selection of Energy Options to Meet Multi Sector Objectives](#)

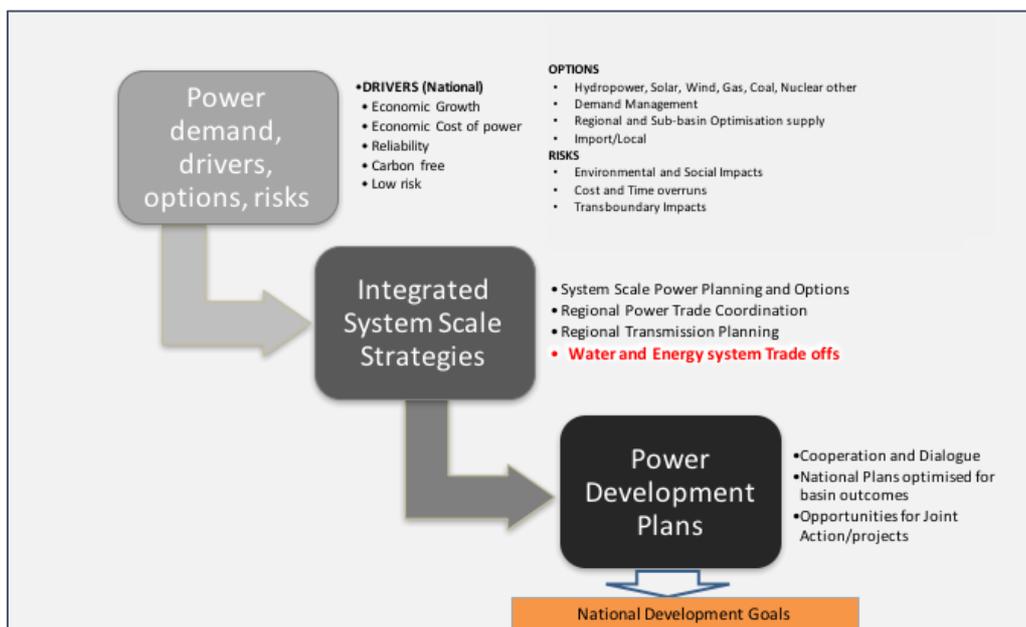
Cost and reliability would be primary drivers for National Power Development Plans (PDPs) in addition to a need to pursue low carbon solutions. Hydropower therefore will feature prominently in these PDPs where suitably economic projects exist. The approach to the development of the SHDS2018 must therefore include an assessment of the alternative sources of electricity generation, their economic competitiveness and role that hydropower can play within that energy mix. This should be considered at a regional scale taking into account perceived national risks associated with alternative solutions (e.g. vulnerability to fuel price fluctuations, regional conflicts etc). The evaluation of the alternative supply options should take into account the environmental and social impacts and economics. The regional supply options will need to consider potential transmission network enhancements associated with alternatives.

##### [Sustainable and Optimal Hydropower Siting, Design and Operation at Basin and Sub-basin Scale](#)

When investigating the optimal hydropower contribution to PDPs, the approach proposed is to seek economically efficient hydropower siting, design and operation at a sub basin scale and at a LMB scale. This requires linkage to power system planning to understand the role that hydropower can play in the power system. Hydropower has the ability to provide ancillary system services and can also provide backup for intermittent renewable energy sources such as solar and wind. This means the contribution of hydropower can go beyond the capacity (MW) and energy generation (GWh) delivery. These alternative roles need to be adequately valued in the system economics.

In addition, a cascade of hydropower projects in a sub basin can be optimised to maximise time of day and seasonal capacity availability and energy generation. In the LMB sub basin projects may be owned by several different companies. The optimal siting, design and operation of existing or planned cascades may require specific projects in a cascade to operate for system scale benefits rather than project scale benefits; related Concession Agreement (CA) and Power Purchase Agreement (PPA) modifications may result.

An optimal system scale dispatch of hydropower within an interconnected grid, linking the other generation sources, would also allow optimisation between sub-basins based on seasonal and intra-seasonal hydrology and system requirements. This however requires a more detailed technical analysis which may only be investigated at a high level in this SHDS2018.

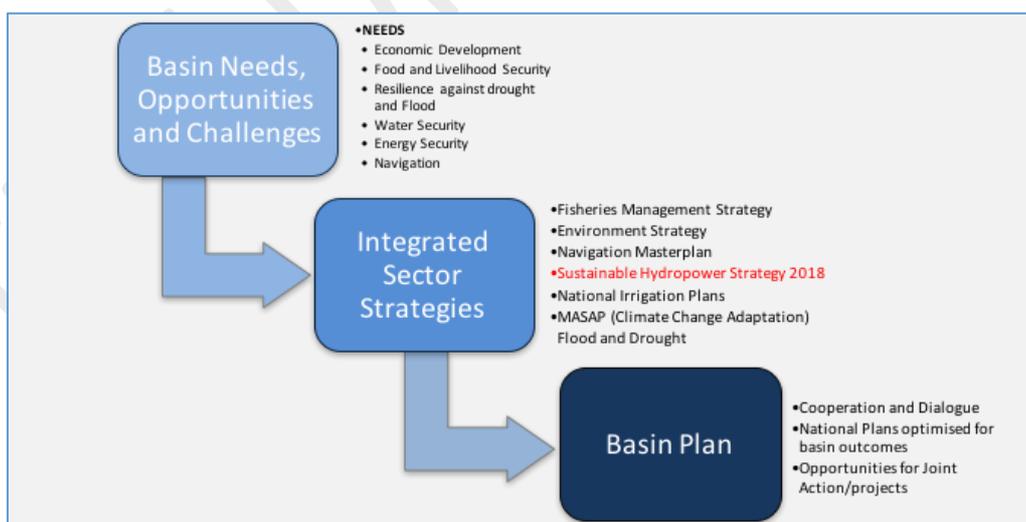


### 4.3.2 Integrated Water Sector Planning

**Note: Integrated Water Sector Planning is the core work of the Basin Development Planning process to be undertaken in 2019-2020. Therefore, the SHDS will form a key input to the BDP work but will only investigate at a strategic level the options for integration of water sector planning as it relates to Sustainable Hydropower Development Strategy. The Alternative HP Development Pathways proposed under the SHDS will be thoroughly analysed under the BDP.**

Figure 2 below illustrates the role that the SHDS2018 will play in meeting Mekong Basin Needs, Opportunities and Challenges when combined with all other sector strategies.

**Figure 2: Integration of Water Sector Strategies**



### Drought and Flood Management

Hydropower storages may have multiple uses and the SHDS should investigate hydropower development pathways that may enhance flood and drought management in the basin. This may be in the form of:

- Investigation, at a basin scale of the potential for additional storage in hydropower dams to assist with flood and drought management;
- Design of certain suitable hydropower storages to include additional volume for flood management;
- Design of operating procedures and transboundary cooperation mechanisms to allow release of water from hydropower dams to downstream users in times of drought; and
- Operational coordination between hydropower storage dams on one sub-basin to allow the above drought and flood management to occur.

#### [Fisheries Masterplan and SHDS2018](#)

The impact of hydropower on fisheries has been documented in the BDP2 and the Council Study. In order to mitigate and offset the hydropower impacts on fisheries, a basin scale masterplan for fisheries management will need to consider joint actions that may be possible to protect the capture fisheries resource and offset the impact of hydropower.

While the **mitigation** of impacts on mainstream and tributary hydropower would be an essential first step, certain sustainable hydropower development pathways may reduce the impacts through:

- **Avoidance of Impact:**
  - Removal of certain high impact projects from the national plans; and/or
  - Re-siting of certain high impact projects away from the main stem of sub-basins; and/or
  - Re-design of the high impact projects to allow fish passage and reduce biodiversity loss;
- **Offsetting the Impact:** Allocation of certain sub-basins as “in tact” river reaches to protect biodiversity and allow migratory species access to spawning grounds;
- **Compensation:** Overall fisheries management of stock, habitat, etc funded through benefit sharing mechanisms as an offset. This may include costs effective installation of fish passage on the multiple irrigation weirs across the basin to improve access to habitat.

#### [Protection of Environmental Assets and the SHDS2018](#)

An Environment Strategy is under development by the MRC. It is proposed that this Environment Strategy documents sensitive and globally important ecological zones that the MRC Member Countries agree should be protected across the Lower Mekong Basin. Once these zones have been agreed and the parameters around their protection documented (geographical locations, requirements for water flow, level and seasonality etc) the implications for the hydropower planning, design and operations can be considered. These constraints can then be included in options for sustainable hydropower development pathways for consideration by member countries.

In addition, the operation of tributary and mainstream projects should include a discussion on allocation of water for the environment and the release of environmental flows. These operational changes will need to be justified through an understanding of the nature of the environmental values that are to be protected through the releases.

### [Navigation Master Planning](#)

A Navigation Masterplan has been developed by the MRC<sup>10</sup>. This Masterplan includes options to enhance the navigability of the LMB. These plans should be considered in particular for mainstream hydropower development options and design.

### [Irrigation Planning](#)

As for the flood and drought management mentioned above, storage in hydropower dams may alter the seasonality of the flows in the mainstream and tributary river of the LMB. This may indeed provide an opportunity for dry season abstraction from the rivers for irrigation. However, the operation of the hydropower dams will not necessarily be optimized for irrigation. Therefore, where major irrigation developments are proposed across the basin, coordinated planning with hydropower may be appropriate.

For existing or under-construction projects this may include sharing of information on hydropower dispatch patterns and water releases, and alteration to the water allocations in the basin. This may be done through national Water Law arrangements of transboundary negotiation.

### [Mekong Climate Change Adaptation Strategy and Action Plan \(MASAP\)](#)

The ability for Hydropower to influence or improve resilience of the LMB to Climate Change will also be considered.

### [Cooperation on Integrated Planning](#)

For basin-wide and transboundary integrated planning and implementation to be successful, the national and regional plans must be found to be mutually beneficial and aligned. The difficult economic, environmental and social trade-offs associated with the basin development will need to be well understood and presented to stakeholders. Any basin scale Sustainable Hydropower Development Strategy will need to be seen to deliver an equitable sharing of costs and benefits between member countries when we seek to meet a wide range of basin needs.

The nature of this planning approach will mean that National Plans may be “optimized” for basin outcomes. Therefore, the approach to the SHDS will need Council level support as these changes may affect the timing, scale and location of certain nationally planned projects.

## **4.4 Technical Evaluation Methodology**

It is proposed to develop the SHDS2018 using a strategic level technical evaluation method that allows MRC to understand the supply/demand drivers for hydropower development and other supply options in the region and the relative impacts, costs and benefits of the hydropower developments in the Mekong basin at a strategic level. This will draw on the recent work of the Council Study, the Basin Development Planning process and Scenarios Assessment, the work of ISH and other regionally relevant work (SEA, Delta Study) to provide information to support the evaluation. A deep understanding of the region’s power development plans (PDPs) would be required.

The Technical Evaluation Method will support Participatory Planning under the Basin Development Strategy and will draw on already available information, tools and analysis to provide suitable resources for the planning process. The Technical stream will present all relevant and necessary

---

<sup>10</sup> Design of a Master Plan for Regional Waterborne Transport in the Mekong River Basin; (MRC, 2016)

sectoral, technical, economic, social and environmental information for the Interactive Participatory Planning Process.

#### 4.4.1 Framework to Guide Approach

In order to address the above set of Strategic Issues through and suitable level of analysis and consultation with the four Member Countries and relevant stakeholders it is proposed to use the framework developed by the MRC and partners within the Rapid Basin-wide Hydropower Sustainability Assessment Tool (RSAT). This allows a comprehensive coverage of the issues to be addressed.

As this is a strategic planning exercise, it will be important to focus effort on those hydropower projects that affect Basin Scale and transboundary related issues.

Appendix 2 groups relevant Basin-Wide and Trans-boundary concerns into 10 RSAT topics with the suggestions for the use of MRC Tools, Guidelines and methods.

#### 4.4.2 Proposed Process for Interactive and Iterative Development of the SHDS2018

**NOTE: Following from the National Consultations on this Concept, the scope and approach to the SHDS2018 have been significantly reduced. The approach will now not be based on detailed modelling and evaluation of the alternative Development Pathway options but will rely on the recently completed Council Study and other related studies (ISH0306, BDP2). The revised scope and approach will be in the form of a Strategic review of the current PDPs and related HP Strategies as they relate to the Mekong River Basin development plans. Therefore, there will be substantially reduced use of previously developed ISH tools and guidance.**

##### Understanding the Basin Vision and Goals – Stakeholder Engagement

In order to include the above broad cross sector assessment of alternative sustainable hydropower development pathways it will be necessary to understand the priorities and agreed Mekong Basin outcomes. This vision for the status of the Mekong Basin in say 30 years is to some extent documented in the Basin Strategy. However, clarifying the specific targets and weighting of economic, social and environment indicators from the perspective of a range of stakeholders would be important first step<sup>11</sup>.

##### Gathering Inputs from Regionally Relevant Plans and Assessments

As noted above, gathering a detailed understanding of the regions PDPs and the underlying drivers, assumptions and options will be important.

A number of Cumulative Impact Assessments have been undertaken in recent years culminating in the MRC's Council Study but also including the VNMC's Delta Study, Case Study within ISH0306<sup>12</sup> and the MRC's SEA<sup>13</sup>. In addition, there are a number of and other relevant resources and current ongoing CIAs and related investigations in sub-basins.

---

<sup>11</sup> Guideline for the Evaluation of Multipurpose Hydropower Project Portfolios (MRC, 2015)

<sup>12</sup> Reference Guidelines for Hydropower Environmental Impact and Risk Mitigation in the Lower Mekong Basin Mainstream and Tributaries (MRC, 2017, in progress).

<sup>13</sup> Strategic Environmental Assessment of Hydropower on the Mekong Mainstream (ICEM, 2011)

A large volume of information will have been assembled and analysed as part of the MRC's Council Study. It is envisaged that this information will be the core resource for evaluating at a preliminary level for alternative development pathways as part of the SHDS. The Council Study information is also likely to be the main source of information for the upcoming Basin Development Strategy.

In addition, the work of past Basin Planning exercises (e.g. BDP2) should be taken into consideration as a resource, updated where necessary

It will be necessary to assemble the strategic information of other LMB sector strategies as they relate to the SHDS (e.g. Fisheries, Navigation, Environment, Flood and Drought, Climate Change). Some of these have been completed by the MRC in 2016, but others are under development.

#### [Analysis and Preparation of Planning Tools](#)

The outputs from the Council Study and other recent studies will form the basis for the cross-sector assessment of an initial set of alternative sustainable hydropower development pathways that may achieve the SHDS Objective. The Power Planning methods will need to be based either on the existing OptGen<sup>14</sup> model or an alternative proposed by the Technical Team.

The Technical Team will be to become familiar information arising from regional GMS studies and be able to use this information to consider alternative sustainable hydropower and power development pathways in a suitable form to allow discussion of opportunities and trade-offs. It will be necessary for the Technical Team to evaluate alternative scenarios at a strategic level, with the MRC experts, to test certain development pathways that may be considered by the Stakeholders.

#### [Stakeholder Interactive Planning Workshops](#)

Interactive Planning Workshops with MC are envisaged to explain the development pathways and determine if further pathways should be considered. A number of alternative sustainable hydropower development pathways may be proposed from the outputs of the Workshops to be evaluated and relevant costs, benefits and indicators outcomes documented.

Additional interactive planning workshops with MC may be facilitated to explain the outcomes of the follow-up assessment and to further development pathways and determine if further pathways should be considered. Selected options for development pathways with their impact on basin Needs, Opportunities and Challenges (using Basin Indicator Framework) to MC for consideration as part of the Basin Strategy.

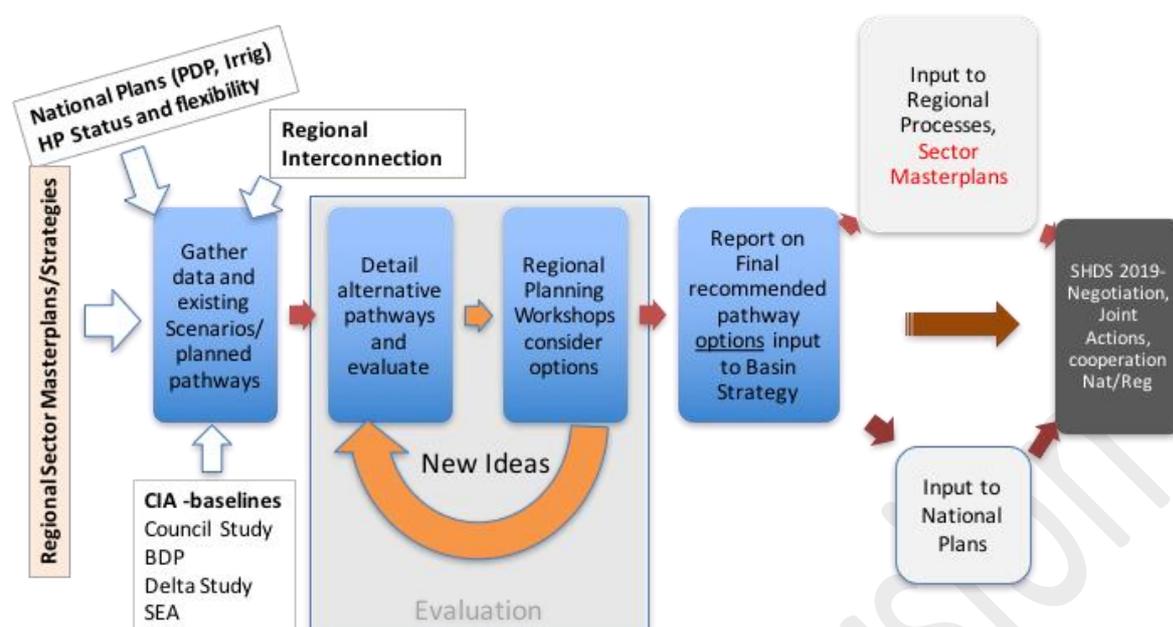
#### [SHDS2018 as Input to National and Basin Planning](#)

Outputs from the Stakeholder Workshops will be documented to provide detailed descriptions of sustainable hydropower development pathways for Basin Strategy work and provided to the MC for input to National Planning processes. The intention would be to revert back to high level Council Meeting with the SHDS2018 for their guidance.

Part of the SHDS Technical Team will participate in the Basin Strategy Process with other sectors to consider if there are alternative strategies that may be appropriate at a Basin Scale;

---

<sup>14</sup> <https://www.psr-inc.com/software-en/?current=p4040>



#### Considerations in the Assessment of Hydropower Project Portfolio

The SHDS2018 may propose a re-assessment of the list of hydropower projects planned for construction in the years ahead. This may be in terms of a combination of location, scale or design of mitigation and operations using the above tools. It will be necessary to ensure that any changes to projects are practical given the development status on the projects. If a project is already well advanced along its development path it may not be possible to make significant changes to certain locational and design parameters.

Therefore, it is proposed to do an initial screening to identify:

- A list of hydropower projects which are already strongly committed such as projects having their Concession Agreements signed and/or being under construction or will be constructed in the near future;
- This screening will also need to reveal level of commitment (i.e. is it closer to pre-feasibility or financial close) to understand those projects that have greater 'flexibility' on siting and design and are able to be re-assessed within the Technical Stream; and
- The operational flexibility of all key projects.

Note that only projects which have significant transboundary impact at a basin-scale strategic level, will be evaluated on a case by case basis. General consideration of overall basin-scale requirements (e.g. additional flood storage, release of additional environmental flows) may be made where multiple tributary projects may have potential transboundary affects.

#### 4.5 The Outputs of the SHDS

The basin scale SHDS2018 will be detailed that aims to meet the Objective of the SHDS. The main output of the SHDS2018 planning process is anticipated to be a shortlist of hydropower development pathways with clear description of the trade-offs that are analysed for each shortlisted option. The Sustainable Hydropower Development Strategy will detail these development options and the relative costs and benefits.

Specifically:

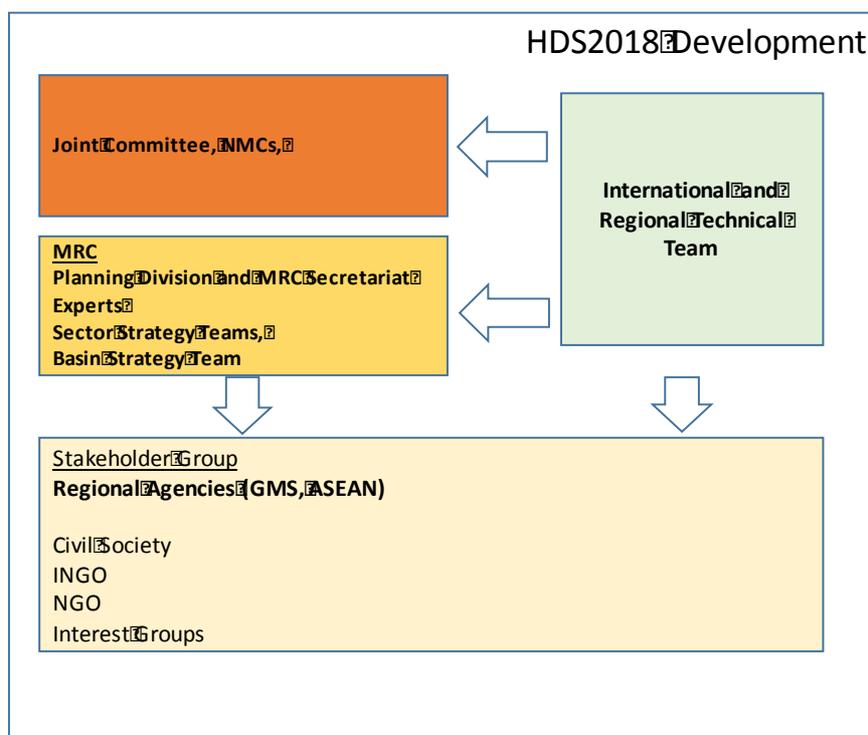
- ⇒ **Documented alternative sustainable hydropower development pathways for more optimal development for hydropower resources of the Mekong mainstream and its tributaries;**
- ⇒ **A description of opportunities to enhance benefits beyond national borders and avoid, minimise or mitigate adverse transboundary impacts; and**
- ⇒ **Inputs to crosscutting strategies of other sectors to benefit the Basin Planning process for 2021 to 2025.**
- ⇒ **Agreed set of follow-up Strategic Actions detailed to ensure the delivery of the SHDS.**

In addition, an agreed set of **Strategic Actions** will be detailed to ensure the MRC is able to deliver on the expectations of the MC towards the SHDS objective and the implementation of a preferred Sustainable Hydropower Development Strategy.

The SHDS is proposed to be presented to the JC who will already have been briefed by their national members of the Planning Team. The JC will be asked for guidance on further advancing the SHDS.

## 5 Team Structure and Stakeholder Groups

The structure of the personnel to be engaged in this activity is indicated in the diagram below.



### 5.1 Technical Support Team

Terms of Reference for the Technical Support Team will be developed to implement the steps indicated above in the Technical Evaluation Stream. This technical team will be made up of suitable international, regional and National experts covering the social, economic, hydropower, hydrological system modelling, ecological, environmental skills needed to support this process. Linkage to, and knowledge of, ISH tools and guidelines, past Basin Planning processes and the Council Study would be beneficial to make the analytical process more efficient.

### 5.2 Stakeholder Engagement

#### 5.2.1 Internal Secretariat Support

The development of the SHDS2018 and the integration with the other sector strategies and ultimately the Basin Strategy will require truly cross disciplinary cooperation within the MRC. This also means that this work will need to be prioritized inside the organization to ensure adequate focus from the relevant Secretariat experts. The Concept should be fully understood and approved by the Secretariat senior management so that it may be supported by them in discussions at the JC and with external stakeholders at every opportunity.

In addition, the linkages and separation of duties between the Planning Team and the MRC's "Expert Group" in the planning space as well as the Joint Platform will need to be rationalized. The idea would be to avoid unnecessary duplication of personnel or effort.

#### 5.2.2 Joint Committee and Council

It will be very beneficial and even essential to get early support from the JC and Council for the Objective, Principles and Process proposed in this Concept Note. This will greatly improve the

cooperation of national agency staff to contribute constructively to the process and support them when they report alternative development pathways back to their national agencies.

It is proposed to get this support from the JC in November /December 2017 when the Council meets. Regular update to the JC will be provided. This will allow a close follow-up from the Pak Beng PNPCA and also the Council Study; maintaining momentum for constructive cooperation on these matters through to the next Basin Plan.

### 5.2.3 National Mekong Committees

Clearly the engagement and support of the NMCs will be critical to the success of this process. The JC consideration and support for this process should facilitate this engagement from the NMCs.

### 5.2.4 External Stakeholders

MRC relevant external stakeholders should be properly involved in the SHDS where appropriate.

The selection of stakeholders should recognize the sensitivity of some project issues but allow for sufficient stakeholders to join the Stakeholder Group so that representation is inclusive and comprehensive.

The maximum number of stakeholder representatives will vary depending on the application, but should be sufficient to make the teams representative but workable.

It is proposed to present a summary of this concept note at the Stakeholder Platform planned for November or December 2017.

## 6 Key Steps in the development of SHDS2018

The indicative timeline for the Study is shown in Figure 3 below. The progress of the study will depend on timely recruitment and mobilisation of the technical team and availability of member countries and stakeholders for appropriate consultation.

Figure 3: Proposed Timeline for Sustainable Hydro Development Strategy

STEPS	2017			2018								2019							
	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4								
SHDS Timeline	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
Prepare CN and TOR; Internal MRCS consultation																			
Submit CN/TOR to MCs for consideration				Nat	Reg														
Joint Committee Information																			
Procure Technical Team																			
Mobilise Technical Team																			
Preparation for work scope and Project Plan																			
Inception Report (Methodology)																			
Technical Analysis and Preparation																			
Interim Report (Draft Alternative Development Pathways)																			
Iterative Regional Planning Workshops/Evaluation																			
National CONSULTATION																			
Draft Final Hydropower Development Strategy																			
Regional CONSULTATION					*					*									
Stakeholder Forum						*										*			
Governance Process																			
MRCS Consideration, Guidance on next steps and endorsement					*														
Milestones	Draft Concept Note for National Consultations	TORs, Briefing Council Study/ Reviewed Input	Nat'l Consultation on SHDS and DG Procurement Plan, Budget, Reg. Reg. on Concept	JC Guidance, Commence Procure	Tenders Close, Evaluation	Tender Evaluation appointment	Mobilise Consultant team	National Regional team mobilised	Inception Report, Regional Consult	Literature review and data collected	Methodology reviewed and documented	First Regional Planning Workshop	RPW results and draft 2: Alternative development pathways	RPW#2	Draft Strategy for National Consultation	National Consultation Documented	Draft Final Strategy	JC Endorsement for Council Approval	Council Approval written communication

## Appendix 1: The MRC Hydropower Principles 1998

The former Mekong Committee (MC) - in line with its mandate - promoted investigations for hydropower development, including feasibility studies, for both mainstream and tributary projects. With the signing of the 1995 Agreement, the Mekong River Commission (MRC) in its present form was established. The new mandate of the Commission since 1995 is to co-operate and promote sustainable development, utilisation, management and conservation of the water and related resources of the Mekong River Basin for the economic and social well-being of the people in all the riparian countries.

As a result of the new mandate, MRC will concentrate its hydropower activities on the basis of integrated planning of the mainstream and basin-wide sub-basins, and investigations up to a certain level, such as the pre- investment stage. Construction and related detailed studies rest with the countries and lending agencies.

To accommodate the changes in the MRC mandate and in the prevailing conditions in the Lower Mekong Basin, the Council of MRC in 1998 approved

the following five principles:

- (1) *Information is exchanged among the MRC member states as well as the GMS countries;*
- (2) *Close co-operation with international institutions, such as the Global Water Partnership and the World Commission on Dams, for consultation on suitable ways and means for sustainable development of hydropower projects;*
- (3) *MRC should concentrate its hydropower activities on basis of integrated planning of the mainstream and basin-wide sub-basins and investigation up to a certain level such as pre-investment stage. The construction and related studies rest with the countries and lending agencies, while the MRC should co-ordinate and monitor basin-wide activities. The MRC should also have a role in the preparation of regional transmission network and power trade (provided this is a strategic goal for MRC);*
- (4) *State of the art of cumulative environmental impacts and socio- economic aspects as well as a mechanism for public participation by stakeholders in hydropower planning and development should be carried out by MRC in its efforts to promote the most effective use of the natural resources in the Lower Mekong Basin; and*
- (5) *MRC should encourage private sector to join its efforts in developing hydropower potential with proper consideration to the environment and the well-being of the people living in the Basin.*

## Appendix 2: Framework for Consideration of Basin-Wide and Trans-Boundary Concerns for the SHDS2018

RSAT Topics	Particular Basin-Scale and Trans-boundary concerns requiring special attention	Suggested MRC Tools, Guidelines, Methods, References etc.
<b>Topic 1:</b> Institutional Capacity	Engage LMB governance mechanisms and transboundary cooperation using MA95 Articles and Procedures to form the basis for dialogue on SHDS Representation and engagement of national energy and water agencies in SHDS development. Reference to National sustainable development policy, standards and frameworks Consider requirements for Basin Governance in the hydropower sector.	ISH02 <sup>15</sup> PNPCA, PDIES, PMFM, PWQ
<b>Topic 2:</b> Option assessment, siting and design	Assess options for water services and energy supply, ensure demonstrated needs against national and regional supply/demand Siting selection, maximise energy production, minimisation of impacts; Multi-criteria options assessment; Risk Avoidance and mitigation measures Planning and coordination for effective operation of mainstream and tributary cascades; Implementation and operation of navigation locks;	ISH01 <sup>16</sup> ISH02 ISH0306 <sup>17</sup>

<sup>15</sup> Guidelines for the Evaluation of Multipurpose Hydropower Project Portfolios (MRC, 2015)

<sup>16</sup> Identification of Ecologically Sensitive Sub-basins for Sustainable Development of Hydropower on Mekong Tributaries (MRC, 2015)

<sup>17</sup> Guidelines for Hydropower Environmental Impact Mitigation and Risk Management in the Lower Mekong Mainstream and Tributaries (MRC, 2017 in progress)

RSAT Topics	Particular Basin-Scale and Trans-boundary concerns requiring special attention	Suggested MRC Tools, Guidelines, Methods, References etc.
<b>Topic 3:</b> Economic contribution of hydropower	<p>True least net economic cost planning to maximise social and economic value; facilitated through regional integration of energy markets and electricity power transmission plans.</p> <p>System efficiency (national and regional); long term economic benefit from Power Development Plan, considering a realistic power production assessment, Optimisation use of hydropower in the power system to maximize its value (e.g. to support other renewables, integration between storage and run-of-river schemes).</p> <p>Regional macroeconomic assessment, SEA and Tb Economics benefits as well as Options for "Joint Action/Projects", etc.</p>	ISH02 Alignment with GMS and ASEAN integration <sup>18</sup> MRC Council study <sup>19</sup>
<b>Topic 4:</b> Equitable sharing of hydropower costs and benefits	<p>Explore Potential for Joint Action/Project - mutual trans-boundary benefits</p> <p>Planning GMS and ASEAN interconnection, electricity power trading, etc.</p> <p>Exploration of Carbon finance, etc.</p>	ISH02 Concept of Benefit Sharing as promoted by MRC/BDP <sup>20</sup>

---

<sup>18</sup> Ensuring Sustainability of GMS Power Development (ICEM, 2013)

<sup>19</sup> Study on the Sustainable Management and Development of the Mekong River including Impacts of Hydropower Projects (MRC, 2017, in progress)

<sup>20</sup> Benefit Sharing Options for Hydropower on Mekong Tributaries, Regional Synthesis Paper; MRC, January 2014.

RSAT Topics	Particular Basin-Scale and Trans-boundary concerns requiring special attention	Suggested MRC Tools, Guidelines, Methods, References etc.
<p><b>Topic 5:</b> Social issues and stakeholder consultation</p>	<p>Broad Stakeholder Consultation and examination of past Stakeholder Consultation reports Baseline demographics, poverty, gender, ethnic matters – basin scale Food Security: multiple purpose dams, project selection and implementation that minimizes disruption to local communities, preservation of fisheries. Social risk assessment at basin scale, etc.</p>	<p>ISH02, SEA<sup>21</sup>, SIMVA<sup>22</sup>, BDP<sup>23</sup> Compare with BDP Scenario, GMS assessments Council Study MRC Fisheries Management Strategy</p>
<p><b>Topic 6:</b> Environmental management and ecosystem integrity</p>	<p>Retention of “Intact River sub-Basins” Avoidance for Ecology sensitive areas and environmental Hot Spots Option to maximize multi-purpose use of HP Reservoirs - wetlands</p>	<p>ISH01, ISH02 ISH0306 MRC Environment Strategy</p>
<p><b>Topic 7:</b> Flows and reservoir management</p>	<p>Optimization for the use of HP capacity and storage in basin and cascade; Design and operations both locally and at a basin scale to include the possibility to regulate flows from the wet to the dry season, opening up opportunities for increased dry season abstractions and potentially for flood control. Address <b>climate change, water poverty</b> challenges in the basin. (e.g. through provision of adequate information on potential effect of CC on HP and ways HP can help to</p>	<p>ISH01, ISH02 ISH0306 MRC Climate Change Reports</p>

<sup>21</sup> Strategic Environmental Assessment of Hydropower on the Mekong Mainstream (ICEM, 2011)

<sup>22</sup> Social Impact Monitoring and Vulnerability Assessment (MRC, 2014)

<sup>23</sup> Basin Development Plan (MRC, 2010); Assessment of Basin-wide Development Scenarios (MRC, 2011)

RSAT Topics	Particular Basin-Scale and Trans-boundary concerns requiring special attention	Suggested MRC Tools, Guidelines, Methods, References etc.
	mitigate CC) Environmental flows in cascades.	
<b>Topic 8:</b> Erosion, sediment transport and geomorphological impacts	Planning to mitigate risks related to sediment trapping at basin scale; Design for sediment transmission Nutrients Transmission	ISH11 <sup>24</sup> ISH0306 MRC Environment Strategy
<b>Topic 9:</b> Management of fisheries resources	Basin scale river fishery resources through baseline monitoring surveys, Cumulative impact assessment and mitigation both upstream and downstream fisheries, Consider changes in flows, water levels and water quality, fish biodiversity and threatened species, etc.	ISH11 ISH0306 MRC Fisheries Strategy
<b>Topic 10:</b> Dam and Community Safety	Basin Scale Standards, risk assessment, monitoring; Regional seismic and flood standards - investigations Address cascade operations, dam safety, Community safety and emergency response at a basin scale Transboundary warning systems, collaboration on flushing etc.	ISH0306 National Standards

<sup>24</sup> Improved Socio-economic and Environmental Information for Hydropower Planning (MRC 2012)