

# ESNII R&D Needs and synergies:

SFR LFR

SFR LFR GFR

## Topic 2

- Topic 1: Core and Fuel
- **Topic 2: Design and Thermal-hydraulics**
- Topic 3: Materials and coolant technology
- Topic 4: Energy Conversion Systems
- Topic 5: Safety and Instrumentation

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# Focus on...

## **PRIMARY SYSTEM CONFIGURATION (and T/H):**

1. Pool stagnation zones: develop design to prevent stagnation
2. Pool thermal stratification: design may help to prevent
3. Lead has high freezing point (327°C) with a potential for coolant solidification: Primary and DHR design may help to address the issue;
4. Sloshing: show it is not an issue or develop anti-sloshing design
5. Continue investigation on seismic isolation systems

**Note that for most of the above points simulation can play a very important role taking into account the present calculation capability**

## **Limited synergies on COMPONENTS Development (only primary pool):**

1. SGs: efficiency of double tube – continue exp. on SGTR to show not an issue
2. Primary pumps design: low dp, low speed, new design under development
3. DHRs: prevent freezing (at least one week grace time)  
identify DHR2 solution (several possibilities)  
develop/assess safety vessel DHR
4. improve/simplify FAs design – show grids are viable

# Focus on...

## **FUEL HANDLING SYSTEM:**

1. Show cover removal as a viable option
2. Develop FHM and FAs pathway to water pool
3. Decrease (by design) the FAs length;
4. Evaluate fuel storage option inside vessel (strongly help fuel handling)

## **INSPECTION SYSTEM:**

1. SGs: prove continuous monitoring of SGs double tube solution
2. Develop in-vessel “viewing system”
3. Design and test main vessel inspection system
4. Further improve capability of component removal from primary system

## **THERMAL HYDRAULICS and SIMULATION (part of SESAME project):**

1. Simulation tool V&V: especially for low flow, low turbulence conditions
2. Need to take into account 3-D effects in system codes
3. Still need of dedicated experiments (heat transfer, FIV etc.)

# POSSIBLE TOPICS for future collaboration

VESSEL GAP INSPECTION SYSTEM

SAFETY VESSEL COOLING SYSTEM

FUEL HANDLING (Gas handling route )

